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**AN EXPLORATION OF FACTORS INFLUENCING ATTRITION FROM A
PEDIATRIC WEIGHT MANAGEMENT INTERVENTION**

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science
at Virginia Commonwealth University

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Acknowledgments

The author would like to thank several people including my parents for their love and unending support. I would also like to thank my advisor Dr. Suzanne Mazzeo for her guidance and direction throughout this process.

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Abstract

AN EXPLORATION OF FACTORS INFLUENCING ATTRITION FROM A PEDIATRIC WEIGHT MANAGEMENT INTERVENTION

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Virginia Commonwealth University, 2015

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Childhood obesity is a serious health problem in the United States. Numerous weight management programs attempt to address this issue. However, attrition poses significant treatment efficacy challenges. Understanding attendance and attrition from childhood obesity programs is crucial for effective and appropriate resource utilization. NOURISH+ is a community-based treatment program for parents of overweight and obese children (age 5–11 years, BMI \geq 85th percentile). The current study investigated attrition from NOURISH+ to enhance understanding of pediatric obesity treatment retention factors. NOURISH+ participants ($n=70$) completed a questionnaire assessing barriers to adherence and general program feedback. Data were analyzed using frequencies, descriptive statistics, correlation, regression, and qualitative analyses. Practical barriers were commonly endorsed attendance impediments. This study highlights the significant barriers parents must overcome to partake meaningfully in a group parenting obesity intervention. Results could inform the delivery, acceptability, and feasibility of parent-focused interventions for overweight or obese children in urban environments.

An Exploration of Factors Influencing Attrition from a Pediatric Weight Management Intervention

The World Health Organization (WHO) defines overweight and obesity as "abnormal or excessive fat accumulation that presents a risk to health" (World Health Organization, 2014). To measure this construct, the WHO uses an assessment of weight-for-height known as the body mass index (BMI). In adults, a BMI ≥ 25 kg/m² is considered to indicate overweight status and a BMI ≥ 30 kg/m² indicates obesity. For children (age 2-19 years), BMI is calculated as a percentile, which considers age and sex, as well as height. According to the Centers for Disease Control (CDC), children are considered overweight if their BMI is at or above the 85th percentile, but below the 95th percentile, of children of the same age and sex. BMIs at or above the 95th percentile are considered indicative of obesity in children (CDC, 2014).

Obesity is a serious health problem in the United States; 61% of adults are considered overweight or obese (Germann, Kirschenbaum, & Rich, 2006), and obesity is the second leading cause of preventable death, second only to smoking (Blixen, 2006). In addition to accounting for approximately 300,000 preventable deaths annually in the United States, obesity has a severe economic impact; costs associated with this condition total over \$100 billion per year (Blixen).

Rates of childhood obesity have also grown dramatically in recent decades. Some evidence suggests that childhood obesity might be increasing more rapidly than adult obesity (Germann et al., 2006; Lakshman et al., 2013). Childhood obesity is a major public health concern because it is associated with numerous physical health comorbidities and complications (Lakshman et al.). Overweight and obese children are at high risk for type 2 diabetes, hypertension, sleep apnea, musculoskeletal disorders, and psychological problems. Many of these conditions were previously only considered a consequence of obesity in adults (e.g., diabetes, hypertension and

hyperlipidemia), but are now occurring in overweight and obese children. In addition to these medical problems, childhood obesity can have a significant negative impact on social and psychological functioning, as it is linked to depression, low self-esteem, and impaired interpersonal relationships (Lakshman et al., 2013).

There are several available treatments for pediatric obesity (Epstein & Wrotniak, 2010; Golan et al., 2006; Pinard et al., 2012). However, patient attrition or dropout poses a significant barrier to effective intervention for this condition. Often, results of expensive, time-consuming clinical trials addressing chronic health conditions like obesity are not published due to high attrition rates, leading researchers to deem these interventions a failure (Eysenbach, 2005). This phenomenon increases the likelihood that effective treatments are missed or under-estimated (Eysenbach).

Research Aims

The purpose of the current study was to evaluate factors influencing families' participation in a pediatric weight management intervention – NOURISH+. Results informed assessment of this intervention's feasibility and acceptability, and provided guidance for its future implementation. Additionally, results identified strategies to decrease attrition in NOURISH+, and related research and clinical endeavors. The remainder of this introduction reviews research on pediatric obesity and attrition, providing a rationale for this study.

The Public Health Significance of Obesity in the US

Obesity has substantial health and economic consequences. Obesity is a global health concern. It is associated with numerous comorbidities, including, type 2 diabetes, cardiovascular diseases and several forms of cancer (Wang et al., 2011). One of the greatest concerns about childhood obesity is that it typically persists into adulthood (Au, 2011). Moreover, the severity

of obesity typically *increases* from childhood into adulthood. Research suggests that childhood obesity might raise the risk of adult morbidity and mortality, independent of adult BMI (Lakshman et al., 2013). Children who are overweight or obese also have increased risk for other pediatric health problems, including asthma, sleep apnea, abnormal glucose intolerance, hypertension, and type 2 diabetes (Au). In addition to the physical risks associated with excess body weight, obesity is linked to several negative emotional consequences. Longevity, productivity, quality of life and disability-free life-years are also all negatively impacted by excess body weight (Wang et al.). Overweight and obese children also frequently experience low self-esteem, depression, and psychosocial problems including peer discrimination (Au).

The public health burden of obesity is also reflected in the economic impact of this disease. Obesity-related health-care costs are increasing rapidly and causing worldwide economic burden (Wang et al., 2011). Countries with the highest proportion of the population who are overweight or obese suffer the greatest economically, due to greater use of health services and high treatment costs for obese individuals (Wang et al.). Health-care costs related to obesity are projected to double every ten years. By 2030, if trends continue, these costs are expected to account for 16-18% of health-care expenditures in the United States (Wang et al.).

Trends in Childhood Obesity

The World Health Organization has called childhood obesity “one of the most serious public health challenges of the 21st century” (Au, 2011). It is predicted that, in the United States, 9.1% of children under five years of age will have a BMI two standard deviations or higher above the mean by the year 2020 (Lakshman et al., 2013). Indeed, overweight is the most common health problem among children in the United States. In 1980, the prevalence of overweight in children in the United States was just 6%. This rate rose to 19% by the year 2004

(Ogden, Yanovski, Carroll & Flegal, 2007). Currently, 31.8% of children ages 2-19 are overweight (Ogden, Carroll, Kit & Flegal, 2014). Moreover, African American and Hispanic children are disproportionately affected by overweight and obesity (Cote et al., 2004; Pena et al., 2012, Ogden et al., 2014), as are children from lower socio-economic status (SES) groups (Pena et al.). Specifically, in the U.S., 38.9% of Hispanic children, and 35.2% of non-Hispanic Black children ages 2-19 have a BMI \geq 85th percentile compared with 28.5% of non-Hispanic White children (Ogden et al., 2014).

Childhood obesity treatment. Many treatments for chronic illness such as obesity are known as self-management interventions. Self-management is defined as, “the individual’s ability to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes inherent in living with a chronic condition” (Newman, Steed, & Mulligan, 2004). These treatments focus on self-reliance, individual responsibility, and self-regulation of behavior (Vinkers et al., 2013). Although obesity treatment seems simple – decrease caloric intake while increasing physical activity – in practice, there are few effective interventions. The treatment of both adult and childhood obesity is complicated by a complex interaction of factors including environmental, genetic, patient, familial, and cultural characteristics (Ross, Kolbash, Cohen & Skelton, 2010). The most successful obesity treatments are comprehensive interventions combining weight management and behavioral components (Ross et al.). One prominent example of this approach is a treatment involving behavior modification guided by Epstein and colleagues’ (1998) behavior change model (Ross et al.) This model includes the use of small, frequent reinforcements (e.g., rewarding positive behavior with non-food items). Other behavior changes include improving self-monitoring and stimulus control.

Another important component of the behavior change model involves primary caregivers in family-based obesity treatment approaches (Ross et al., 2010; Golan, 2006). This approach considers that obesity tends to run in families, for numerous genetic and environmental reasons. Thus, involving caregivers and utilizing familial resources is vital to improve childhood obesity treatment efficacy. This approach involves targeting the eating behavior and activity levels of the entire family (not just those of the individual child in treatment), and teaching parents behavioral skills to help the child and family negotiate these changes. This fosters positive relationships between parents and children and is, therefore, mutually beneficial (Epstein, Paluch, Roemmich, & Beecher, 2007).

The home environment is an essential setting in which to incorporate treatment as it shapes much of a child's eating and activity behaviors. The household environment greatly influences a child's experience with food intake through modeling, frequency of exposure to foods, portion sizes, and mealtime structure (Golan, 2006). When addressing pediatric weight management, parental and familial support is vital (Barlow & Ohlemeyer, 2006). Further, treatment of pediatric obesity requires a strong commitment from caregivers, who will be highly involved and encouraged to make changes in their home environment. For this reason it is extremely important to understand factors influencing parent's adherence to specific pediatric obesity interventions to minimize the pernicious problem of attrition.

Weight Management Studies and the Problem of Attrition

What is attrition? Attrition is defined in multiple ways in the behavioral medicine literature. Generally, attrition refers to the phenomenon of patients prematurely terminating treatment (Davis & Addis, 1999). However, this term has also been defined as failure to attend pre-treatment sessions, session non-attendance, and failure to complete follow-up (Davis &

Addis; Eysenbach, 2005). Given the numerous definitions of attrition, it can be very difficult to compare this phenomenon across studies.

Additionally, premature termination is particularly prevalent among patients with a chronic condition for which lifestyle changes are a crucial part of the treatment, such as obesity (Davis & Addis, 1999). In multiple types of interventions for chronic conditions, high dropout rates are common (Vinkers, Adriaanse, & De Ridder, 2013).

Attrition in weight management and obesity studies. Attrition is high in both clinical practice and research addressing weight management (Barlow & Ohlemeyer, 2006). Attrition in obesity research ranges from 10-80%, and varies by study setting, design, and treatment strategy (Grossi et al., 2006). Even hospital-based weight management and specialty clinics routinely report initial patient non-attendance rates of 28% and higher (Hampl, Paves, Laubscher, & Eneli, 2011). Indeed, individuals with obesity are considered a group particularly prone to dropout (Grossi et al.).

Attrition rates as high as 66% have been reported in weight control programs targeting adults (Cote et al., 2004). Many obesity researchers have studied attrition in an effort to identify characteristics of participants that might predict attendance and completion levels in a given intervention. Unfortunately, while some patterns have emerged, there does not yet seem to be a definitive set of characteristics that predicts program completion (Fabricatore et al., 2009). It appears that even among individuals who are ready to make significant lifestyle changes for the purposes of weight management, several challenges or barriers persist. Furthermore, many individuals might not fully recognize their need to change. These individuals will likely have a larger number of barriers that make weight-loss or weight management more difficult (Mauro, Taylor, Wharton, & Sharma, 2008). This area of study is important as it can help health care

providers understand the practical and psychological processes influencing attrition and inform retention strategies (Geraghty et al., 2010).

Clinicians working in pediatric obesity report that lack of parent motivation and family support are frequently associated with attrition (Barlow & Ohlemeyer, 2006). Indeed, more than 50% of children referred for specialized health services to manage pediatric obesity fail to complete even initial treatment visits. Of families who do initiate care for their children, many only engage in treatment for a short time (Ball et al., 2012). This is concerning because pediatric obesity interventions require lifestyle changes that must be maintained over the long-term. Thus, it is crucial for families to remain engaged not only during the initial treatment phase, but also during the maintenance and follow-up phases to maximize the benefits of the intervention and facilitate positive lifestyle changes initiated during treatment (Hampl et al., 2011).

Addressing attrition is more complicated in pediatrics because the “patient” is not only the child or adolescent but also his/her parent(s) or caregiver(s) (Zeller et al., 2004). Thus, caregiver perspectives on treatment can provide important suggestions to reduce attrition and improve adherence (Cote et al., 2004). In particular, it is important to investigate how treatment success is defined, and how this definition might differ among clinics or between treatment staff and the families enrolled (Hampl et al., 2011). Outcome expectancies have long been cited as important predictors of behavior, especially in psychotherapy studies. Expectancies of families enrolled in interventions should be assessed, as they are critical in understanding decisions to complete or disengage from a program. Individuals with higher expectations of favorable outcomes for a given intervention are significantly more likely to complete it (Geraghty et al., 2010).

Attrition vs. drop-out – Early vs. late dropout. The majority of attrition studies place participants into one of two groups: “completers” or “non-completers.” Completers are individuals/families who complete treatment and non-completers are individuals/families who discontinue treatment prematurely (Vinkers et al., 2013). Less research has investigated the specific timing of premature termination, and individual characteristics associated with attrition and adherence. Many studies treat individuals who discontinue treatment at various time points as one homogenous group (Vinkers et al.). This assumes that the characteristics of those who drop out at early stages of a given study are identical to those who drop out at later stages. However, this might not be the case, as factors such as treatment demands might change as an intervention progresses. Additionally, individuals may be assessing the impact that their efforts have on the desired outcome across the length of the study. Those who are displeased with their results may be more prone to treatment disengagement (Vinkers et al.).

The few studies that have examined the timing of attrition generally classify participants as early or late dropouts. It has been hypothesized that individuals who complete self-management programs might have different characteristics than those who prematurely discontinue (Vinkers et al., 2013). However, many studies that examine dropout focus on characteristics assessed at baseline rather than those collected during the intervention. A study by Vinkers and Colleagues (2013) found that individuals who were “late drop outs” manifested increases on a measure of perceived difficulty of weight loss during the initial phase of the intervention.

The problem of attrition. Even the most effective and efficient treatments for childhood obesity are unlikely to improve the health of a child who fails to complete a significant portion of

the recommended intervention. Therefore, the alarming problem of attrition in pediatric obesity studies must be addressed (Skelton & Beech, 2010).

Additionally, research that seeks to determine intervention effectiveness is skewed by high attrition. Clinical trials are vital to support the effectiveness of interventions; however, statistical power is jeopardized by the attrition observed in many behavioral treatments (Cote et al., 2004; Fabricatore et al., 2011). High attrition compromises both the internal and external validity of the research (Geraghty et al., 2010; Fabricatore et al.). In addition, reducing attrition affords patients greater opportunity to benefit from the intervention and achieve better weight loss results (Fabricatore et al., 2009).

Attrition also impacts access to health care because missed appointments due to non-adherence or premature termination result in further delays in care for those eagerly awaiting a particular treatment (Cote et al., 2004). Feedback from patients lost to attrition could inform approaches to increase adherence. Understanding patients' perspectives is crucial to improving service-delivery strategies that encourage adherence and completion (Cote et al.). High attrition in studies involving significant resources precludes replication due to financial feasibility. In sum, if patients and families are not completing treatment, even potentially effective treatment, there will be less funding to support future endeavors (Skelton & Beech, 2010).

In addition to the attrition challenges common to all behavioral interventions, researchers and clinicians working in the area of obesity face additional barriers to retention (Mauro et al., 2008; Vinkers et al., 2013). For example, in the general population there is a widely held misconception that obesity can be treated through weight-loss alone. In reality, weight loss is often not maintained in the absence of regain prevention strategies (Mauro et al.). Many overweight individuals expect, and often experience, the weight-loss stage of treatment but do

not have the tools to implement the lifestyle changes required for long-term weight loss maintenance. In addition, factors like race and SES of the target population must be taken into account. Children in low-income families are at increased risk for childhood obesity, and the SES of a family can present significant obstacles to obesity treatment, including limited access to healthy foods and safe outdoor play areas, and limited transportation options (Pinard et al., 2012; Mauro et al.). Lastly, time pressures (e.g., having too little time for the program, scheduling conflicts) are frequent and vary among families (Ball et al., 2012; Brennan et al., 2012). For this reason, family-based pediatric obesity programs need to anticipate the need for tools and activities that fit with families' schedules in a flexible, yet effective, manner. This often poses structural and planning dilemmas for program staff and can negatively impact retention and treatment adherence if not adequately addressed.

Frequently Cited Barriers to Treatment Completion

What do caregivers cite as reasons for dropout? There are well-documented difficulties in maintaining patient adherence to childhood obesity treatments. Barriers to treatment completion are evident at caregiver, provider, institutional, managed-care, and community levels (Hampl et al., 2011). These barriers include ambivalence about participation in weight-management treatment, fear of bias or stigmatization of weight status, cultural insensitivity of the treatment providers, and treatment duration and frequency (Hampl et al.).

Practical barriers are also commonly cited as reasons for attrition or early termination in weight management programs (Grossi et al., 2006); these barriers are often defined quite broadly. For example, one study by Kitscha and colleagues (2009), which examined major reasons for adolescent non-return to weight management clinical care, defined issues such as scheduling, parking, location, and time as practical barriers (Kitscha et al.). Practical barriers have also been

defined to include factors such as family or work problems, living far from the treatment center, health problems other than obesity, financial problems, and holidays or school cancellations (Grossi et al.). Barlow and Ohlemeyer (2006) examined parental reasons for drop-out in a self- or physician-referred pediatric weight management program and found that as many as 25% of parent non-completers rated time and location as the largest barriers to attendance. Treatment schedules are cited in several studies as inconvenient or impossible to adhere to due to school or work commitments, or transportation difficulties (Barlow & Ohlemeyer; Cote et al., 2004; Hampl et al., 2011). Parents' reasons for non-return often include the clinic's location and the limited parking options available, as well as low satisfaction with the clinical environment and treatment approach (Ball et al., 2012; Kitscha et al.). Particular programs also fail to meet the expectations of the participating family (Cote et al.), and children and/or parents perceive no benefit from engaging in treatment (Hampl et al.).

Participants who are African American, Medicaid recipients, and those of lower SES typically have higher levels of attrition (Ball et al., 2012; Germann et al., 2006; Zeller et al., 2004). Additionally, individuals with lower self-concepts and greater depressive symptoms appear more prone to intervention dropout (Ball et al.; Zeller et al.). Another potential barrier is caregivers' own weight loss history. Evidence suggests that caregivers who have made multiple past attempts at weight loss, specifically unsuccessful attempts, might be negatively influenced by this history when their child is enrolled in a similar program (Hampl et al., 2011).

How can attrition be reduced? Various strategies have been proposed to reduce attrition in pediatric obesity interventions. Some researchers recommend an ongoing "audit" during pediatric obesity programs to assess parents' perceptions of the intervention. In these audits, parents often provide helpful feedback regarding changes that might reduce attrition and enhance

program engagement (Cote et al., 2004). These efforts might include increasing child enthusiasm, offering preferred appointment times, reducing time demands, helping with transportation, and providing a broader range of services. Indeed, it seems that the child's commitment to participation and his/her role in the decision-making process greatly influences attendance. Parents have reported that children's resistance to treatment attendance impacted family engagement with weight-management programs (Cote et al.) among both younger (aged 5-10 years) and older children (aged 11-17 years). Transportation is another issue often cited as a practical barrier to participation. Consequently, experts have with recommended that programs be located in easily accessible locations and at optimal times for families (Barlow & Ohlmeier, 2006). Although these suggestions are very important to the feasibility and success of a program, there are structural barriers that can make it extremely difficult for programs to be ideal for all families in need, especially given that each family might have a unique perspective regarding ideal times and locations. Reducing costs or insurance requirements were also cited as strategies to improve attendance (Cote et al.). Other suggestions were as small as making reminder phone calls (Cote et al.). Although these minimal changes are important, they do not seem sufficient to produce large improvements in attrition as clinics and weight management studies typically utilize retention strategies such as telephone reminders and/or education reminder materials, and yet attrition remains high (Hampl et al., 2011). The problem of attrition appears to be a more pervasive issue not solved easily through small program changes.

The "fit" between a family's expectations and preferences, and the content, structure, and intensity of a particular intervention is another potentially important component of treatment success (Barlow & Ohlmeier, 2006; Kitscha et al., 2009). For example, family-based interventions (specifically those targeting parents) might be the best way to affect change in the

home environment. Family-based interventions with parents as the primary agents of change emphasize the modification of the social and physical home environment. These interventions also work to target family change rather than child-only change (Pinard et al., 2012). A focus on parents is important because a family's social and cultural environment has a great impact on individual children's nutrition and physical activity behaviors and beliefs (Pinard et al.).

However, the feasibility of maximizing program fit for those in greatest need of services must also be considered. For example, changing some physical barriers such as time and location are often not simple tasks. More feasible short-term changes to interventions include improving resources (e.g., adequate and available trained staff, additional treatment locations), and changing content of educational material to fit the target audience (Kitscha et al., 2009). Additional suggested components to promote adherence include the use of family-centered models, a physical activity component, parent-focused education, participatory intervention planning and delivery, clearly defined messages, adequate training, on-going support, and the use of motivational interviewing techniques (Kitscha et al.).

In sum, there are multiple reasons for attrition in pediatric weight management programs and numerous strategies aimed at addressing this issue. However, given the well-known ethnic/racial and socio-economic disparities in rates of pediatric obesity (Caprio et al., 2008; Lakshman et al., 2013), there remains a need for a more in depth investigation of factors specifically influencing attrition in minority and low-income families (Mauro et al., 2008; Cote et al., 2004). A better understanding of the influencing retention and adherence among families enrolled in weight management intervention programs could help guide future intervention efforts.

Obesity and Weight Management Studies with Low-income/Urban Families

Barriers to treating low-income families. As mentioned above, lower-SES populations are at especially high risk for obesity across the lifespan (Kalinowski et al., 2012; Khloe-Lehman et al., 2006). This association is linked, at least in part, to the high density of fast-food restaurants and convenience stores (and relative lack of grocery stores) in urban, low-income neighborhoods (Alviola, Nayga, Thomsen, & Wang, 2013). These neighborhoods are often described as food deserts, (Alviola et al., 2013; Mauro et al, 2008), or urban areas in which a large range of affordable foods are only available to those with personal transportation or the ability to pay for public transportation (Alviola et al.; Walker, Keane, & Burke, 2010). Residents of food deserts are more frequently exposed to and rely upon the energy- and calorically-dense foods that are immediately available at fast-food restaurants and convenience stores (Walker et al.). Given that families tend to make food choices consistent with the accessible stores in their area, the high density of unhealthy food options can negatively impact community health. For example, diets higher in processed foods, and foods high in fat, sugar, and sodium are associated with poorer health outcomes compared with diets that have a greater complex carbohydrate and fiber content (Walker et al.).

Other factors that pose barriers to healthy lifestyles in low-income families include the high and often unattainable cost of healthy foods, safety concerns regarding outdoor physical activity (like walking), and a greater social tolerance and acceptance of excess body weight (Mauro et al., 2008). Additionally, families often have monetary concerns and budgetary restrictions that influence food selection, gym memberships and weight-loss program options (Best et al., 2012; Mauro et al.).

Another challenge is lack of nutrition knowledge (Khloe-Lehman et al., 2006). Low-income caregivers are less likely to know about health issues related to diet, to use information

on food labels, or to consume diets low in fat (Khloe-Lehman et al.). Behavioral economics research has outlined the psychological and economic factors that motivate individuals towards particular choices. It seems likely that these factors could also be applied to food and activity choices. For example, the availability of healthy substitutions for unhealthy food choices influences individuals' ability to make these swaps (Best et al., 2012). Indeed, there is evidence to support the notion that the relatively higher cost and lower availability of healthy foods act as deterrents to optimal nutrition in low-income populations (Clarke, Freedland-Graves, Khloe-Lehman, & Boham, 2007). Thus, it might not be sufficient to educate families about food substitutions and healthy food choices without also addressing environmental barriers to healthy eating they might face. However, individuals vary with respect to the degree these constraints influence their actions, and these differences might be key in determining which individuals will succeed in weight loss interventions (Best et al.)

Further, all families are a complex system of language, roles, beliefs, values, needs, rules and patterns (Mauro et al. 2008). When an individual attempts weight loss or weight management, his/her individual role in the family might change, which can impact the roles of others in the family unit. It is possible for these changes to create "intimate saboteurs," or individuals who respond to the patient's role change in ways that can derail weight loss attempts (Mauro et al.). It is important to address these potential issues with family members, and strategize ways caregivers can avoid these pitfalls to weight management success (Mauro et al.).

In sum, low-income families face a variety of potential contextual barriers to weight management including food insecurity, safety concerns, access to healthy foods, and nutrition knowledge. Given these concerns, careful attention should be paid when tailoring childhood

obesity interventions such that there is no disconnect between the needs of the population and what the program offers.

Barriers associated with attrition from pediatric obesity interventions. Many studies of attrition from pediatric obesity interventions only examine barriers for non-completers (Barlow & Ohlemeyer, 2006; Kitscha et al., 2009). Individuals who complete interventions are not often asked if they experienced barriers to treatment completion or adherence (Brennan, Walkley, & Wilks 2012). However, to understand the true nature of attrition, it is important to identify barriers for both completers and non-completers. Completers might cite similar barriers but have characteristics that allowed them to overcome these barriers and finish the intervention. A recent study by Brennan and colleagues (2012) sought to address this issue in an Australian sample of parent and adolescent dyads enrolled in an overweight and obesity intervention. This study used a 72-item phone interview developed specifically for the project and based on previous attrition literature. The authors were able to contact 96% of adolescent and 91% of parent completers, and 100% of adolescents and 94% of parent non-completers (Brennan et al.). These numbers are extremely impressive given that many studies lose participants to follow up if they terminated treatment prematurely.

Results indicated the most common reasons adolescents reported for dropping out of the program included not enough time, school commitments, too much self-monitoring required, and burdensome travel (Brennan et al., 2012). Parents who dropped out of the program cited similar reasons including burdensome travel, lack of interest or motivation, and insufficient time to participate. Among families who completed the study, similar barriers were cited as interfering with participation. Adolescents reported school and other commitments posed barriers, as well as a general lack of time. Similarly, parents endorsed not enough time, too much monitoring,

and lack of interest or motivation as barriers to participation (Brennan et al.). Although these findings are an important addition to the obesity attrition literature, many questions remain unanswered. For example, this intervention focused on adolescents and their parents. Because of their developmental stage, adolescents might have had more influence on the decision to complete or drop out of the intervention than would younger children. Additionally, this study was conducted in Australia; it is unknown what might emerge from a similar study conducted in the United States, specifically in an urban, socioeconomically and racially diverse region. Finally, a limitation of this study was that the demographic characteristics of the sample are not reported. Given the significant challenges associated with recruiting and retaining low-SES and minority groups in treatment, it seems important to replicate this study in a more diverse setting. Further, the length of their questionnaire would likely not be feasible for busy working parents with multiple time demands to complete. A condensed version of Brennan and colleagues' questionnaire might be more useful.

Purpose of the Current Study

Nourishing Our Understanding of Role modeling to Improve Support and Health (NOURISH+) is a randomized controlled trial of weight management for racially diverse families with overweight children (Mazzeo et al. 2012; Bean, Wilson, Thornton, Kelly, & Mazzeo, 2012). NOURISH+ focuses on teaching parenting skills and parental role modeling as a means to improve family-based health behaviors. To enroll in NOURISH+, families must have children between the ages of 5-11 with a BMI at or above the 85th percentile. Additionally, parents or caregivers must be at least 18 years of age and speak English fluently, and the child must reside with the participating caregiver the majority of the time (Mazzeo et al.).

Focusing on parents avoids solely emphasizing the role of the child, which can decrease children's self-esteem and increase risk for disordered eating (Golan, 2006). Additionally, parental involvement is positively correlated with child outcome in pediatric obesity treatments (Mazzeo et al., 2012). Moreover, interventions involving parents offer the possibility of shaping and improving the health of an entire household, which would lead to greater public health benefit than child-centered interventions (Mazzeo et al.).

The current study investigated barriers faced by families enrolled in NOURISH+, both completers and non-completers. Pediatric obesity disproportionately impacts minority and low income families and attrition is a notorious concern among these groups. It is unclear whether results regarding attrition from obesity programs targeting predominantly affluent and European American (or international) samples are generalizable to low-income, primarily African American, urban samples. However, as low-income, minority, and urban families have the greatest risk for obesity, it is essential to enhance understanding of attrition within these groups to improve treatment retention. NOURISH+ is unique in that it focuses on parents exclusively and is to date the most racially diverse parent-exclusive pediatric obesity intervention. Thus the current study could guide similar treatments targeting these vulnerable populations.

Summary and Significance

Obesity is a significant problem in the United States, one that poses serious health and economic consequences for our medical system. By 2030, obesity-related diseases are projected to add \$48-66 billion per year to health care costs in the United States (Au, 2011; Wang et al., 2011). Nearly one third of American adults, and 17% of American children are overweight or obese (Ogden, 2014). Childhood obesity is particularly concerning due to the high risk that it will persist into adulthood (Au). However, with properly structured and implemented interventions,

childhood obesity is treatable, and successful treatment could contribute to future decreases in adult obesity. Researchers are constantly investigating ways to improve childhood obesity interventions (Skelton, Buehler, Irby & Grzywacz, 2012). However, patient dropout and premature termination, or attrition, significantly hinder these efforts (Barlow & Ohlemeyer, 2006). Investigations of barriers to treatment, for both intervention completers and non-completers, can inform strategies to improve participant retention. Such strategies are needed to reduce the social, health, and economic costs of obesity in the United States (Wang et al.).

The goal of this study was to investigate reasons for attrition and facilitators to treatment adherence among families participating in NOURISH+. Results could guide similar interventions targeting populations most at-risk for childhood obesity. We examined the influence of demographic and treatment related factors (including race, age of children and treatment liking), on attendance and attrition to inform future research based upon this study's findings. Additionally, individuals who completed the current study were compared on several demographic characteristics to those who declined participation or could not be reached. This indicated how representative the current sample was of NOURISH+ participants as a whole.

Specific aims.

Aim I. The first aim of this study was to identify overall barriers to treatment completion endorsed by participants. Potential differences between NOURISH+ completers and noncompleters of NOURISH+ were assessed. Additionally, differences in NOURISH+ session attendance (dosage) was evaluated for individuals who participated in the current study and those who declined participation. First, potential demographic differences were explored to determine if completers and noncompleters differ on key characteristics. Second, the current study investigated factors that hindered parent participation among both program completers and those

who dropped out of the program and evaluated differences in barrier endorsement across the two groups. Based on the attrition literature, it was hypothesized that practical barriers, like transportation, and individual and family demands would be among the most commonly endorsed hindrances to participation. Additionally, it was hypothesized that two-parent households would report fewer barriers to attendance than those with only a single primary caregiver. It was also hypothesized that families with more children would have a greater number of barriers than those with fewer children.

Aim II. The second aim of the study was to evaluate the impact that specific barriers had on session attendance (i.e. intervention dosage). It was hypothesized that the severity of a given barrier would have a greater impact on attendance than the number or type of barriers reported.

Aim III. The third aim of the study was to examine associations among demographic characteristics (e.g. race, income, marital status, number of children) and frequently reported barriers to attendance. It was hypothesized that families with lower incomes would more frequently endorse practical barriers, such as transportation, compared with higher-income families. Additionally, it was hypothesized that two-parent families would report fewer barriers to attendance than those with only a single parent. It was also hypothesized that families with more children would have a greater number of barriers than those with fewer children.

Aim IV. The final aim of the study was to explore attitudes and opinions about barriers and facilitators to NOURISH+ participation. Specific open-ended questions were asked at the conclusion of the questionnaire. Responses provided information regarding the perceived feasibility of NOURISH+, and identified ways the intervention could be improved in the future.

Method

NOURISH+

Recruitment for NOURISH+. Participants were recruited for NOURISH+ through various means including household mailings and radio advertisements. Additionally, recruitment flyers were provided to area school systems and sent to pediatricians, family physicians and pediatric healthcare providers, as well as to churches and community centers that serve predominantly African American populations (Mazzeo et al., 2012).

Eligibility for NOURISH+. Enrollment in NOURISH+ involves several steps. Individuals interested in NOURISH+ were directed by flyers (or professional referrals) to contact the study coordinators to complete a phone screen assessing their eligibility. To participate in NOURISH+, parents/caregivers had to be at least 18 years old and have a child between the ages of 5 and 11 with a BMI \geq the 85th percentile; children must have primarily resided in the parent's home. Participants also needed to speak English, be able to follow basic instructions, and perform simple exercises. Caregivers were ineligible if they were: 1) non-ambulatory, 2) pregnant, 3) had a medical condition that might be negatively impacted by exercise, or 4) had a psychiatric diagnosis that would impair their ability to respond to assessments or participate in a group. Parents whose children had an underlying genetic or other etiology of obesity were also ineligible (Mazzeo et al., 2012).

Baseline assessment for NOURISH+. Individuals who successfully completed the NOURISH+ telephone screening were invited to participate in an in-person baseline assessment. Caregivers who remained eligible following completion of baseline were enrolled in the program and randomized into one of the two study arms: the NOURISH+ six-session group intervention or a control group (Mazzeo et al., 2012). Control group families participated in a single-session "Wellness Night" and received publically available pamphlets regarding pediatric overweight and obesity through the mail during the same six weeks that the intervention group completed its

in-person sessions. Immediately following the conclusion of the six-week intervention, families (in both study arms) completed post assessments. Lastly, all families were further assessed at four- and ten-months following completion of the intervention. For a complete outline of the two arms of the study, please see Appendix B.

NOURISH+ participants. Most families enrolled in NOURISH+ had characteristics described in the literature as difficult to treat, or attrition-prone (e.g. African American, low-income). Parent participants in NOURISH+ were overwhelmingly female (95.2%) and African American (73.1%). See Table 2.1 for racial category distribution.

Table 2.1

Flow-Chart Illustration of Total NOURISH+ Enrollment by Racial Category

	NOURISH+ Intervention (n = 106)	Wellness Control (n = 125)
Black/African American	77	92
White	23	27
Asian	0	1
Multiracial	1	1
Unknown	5	4

The Current Study

Eligibility for the current study. Participants for the current study were recruited from families randomized into the NOURISH+ intervention arm. To qualify for the current study, parents must have consented, enrolled and completed the baseline assessment session with their child (n = 106). Individuals who did not complete consent and baseline assessments were not contacted for this study. The current study's sample included individuals who attended post-testing assessments (completers, n = 90), as well as those who consented to participate and completed baseline assessments, but did not complete post-testing assessments (non-completers, n = 16). The definition of attrition used in this study included individuals who dropped out or

did not attend sessions starting any time after the baseline assessment. Therefore, the dosage (number of sessions attended) range could potentially vary from 0 (only attended baseline and no intervention sessions) to 6 (attended baseline and all six intervention sessions). Of the 70 current study participants, one participant who could not be reached for the current study attended post-assessments but no intervention sessions (dosage = 0) and three individuals attended baseline, but did not attend sessions or post-assessment. Of the 36 eligible individuals who did not participate in the current study, three individuals attended post-interventions but no intervention sessions (dosage = 0) and two individuals attended baseline, but did not attend sessions or post-assessment.

Current study participants. Participants in this study were 70 caregivers who had previously enrolled in NOURISH+. These participants were previously enrolled in waves 1-15 of NOURISH+, and completed all baseline assessments for that trial. Participants who withdrew from NOURISH+ were ineligible. As noted above, a total of 106 possible participants from NOURISH+ met criteria for the current study. Of these 106 eligible individuals, 70 completed the survey for the current study either over the phone or via online (See Figure 2.1).

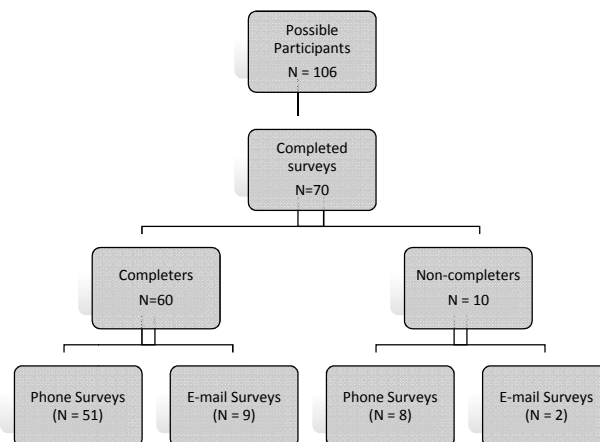


Figure 2.1 Flow-Chart Displaying Participant Contact

Measures and procedures for the current study. Approval to contact previous participants in NOURISH+ was obtained through the Institutional Review Board at Virginia Commonwealth University. Individuals were contacted via their preferred phone contact as noted at their baseline assessment. They were asked to provide verbal consent before participating in this study's telephone questionnaire. This questionnaire was a condensed, modified version of the measure used by Brennan and colleagues (2012) in their study of attrition from pediatric obesity treatment conducted in Australia. Items not relevant to the NOURISH+ treatment population (i.e. questions about adolescents) were eliminated, yielding a 42-item version of the original 72-item questionnaire (Brennan et al.). These items were carefully selected and reviewed by study investigators and experts in the area of pediatric obesity as well as informed by childhood obesity research. The final questionnaire assessed participants' reasons for dropping out (if applicable) or reasons for missed attendance of group sessions. The questionnaire was comprised of eight categories (See Appendix A) including: (1) research demands, (2) treatment approach, (3) program components and strategies, (4) clinical factors, (5) comfort participating, (6) practical barriers, (7) individual and family demands, and (8) health and well-being (Brennan et al.). See Table 2.2 for each category and the corresponding items.

Table 2.2

Questionnaire Items by Category

Scale Name	Items Included
Research Demands (RD; 3 items)	“I did not like completing the questionnaires” “My child and I did not like completing the physical assessment” “I had to wait too long to start the program”
Treatment Approach (TA; 5 items)	“The program did not deal with the causes of my family’s problems” “Instead of working with my child, the program focused too much on me” “The program was not working” “I would have preferred an individual program” “I would have preferred a self-help program”
Program Components and Strategies (PCS; 7 items)	“The behavior change goals were too hard” “There were too many behavior change goals were too hard” “The program sessions were boring” “The program was difficult to understand” “The program took too much time” “The topics of the sessions were not relevant to my family” “The format was too structured”
Clinician Factors (CF’ 4 items)	“The leaders way of talking was hard to understand” “The leaders had different values or beliefs than me” “The leaders put too much pressure on me” “The leaders did not seem to have enough qualifications”
Uncomfortable Participating (UP; 7 items)	“I did not feel comfortable talking about my family” “My child did not want to make an effort to participate in the program” “I was nervous about taking part in the program” “I did not think my child had a problem” “I wasn’t ready to make the changes that the group discussed” “I would have preferred the program was given directly to my child instead of me” “I didn’t feel like I was making as much progress as other people in the group”

Table 2.2 continues

Table 2.2 continued

<p>Practical Barriers (PB; 6 items)</p>	<p>“Getting to the sessions was difficult because of transportation” “I had a long way to travel to sessions” “Session times were not convenient” “My family responsibilities interfered with coming to sessions” “My work schedule interfered with coming to sessions” “I wanted to be in the less intensive group/the group that only met one time for the wellness night”</p>
<p>Individual and Family Demands (IFD; 6 items)</p>	<p>“My family had too many other problems occurring at the same time” “There were too many pressures going on around me” “I was having financial problems that the group didn’t understand” “I did not want to participate because the program interfered with other aspects of my life” “Other members of the family made it difficult for me to make the changes I wanted to make” “When you participated the NOURISH+, how many adults and how many children lived in your household”</p>
<p>Health and Well-Being (HWB)</p>	<p>“My health made it difficult to participate” “I was feeling too unhappy to participate” “My child was feeling too unhappy to participate”</p>

Each response cited as a barrier to participation was rated on a three-point scale indicating its severity (i.e., how much the barrier influenced attendance), ranging from 0 (“*not at all*”) to 2 (“*a lot*”). This measure also included structured, open-ended questions which elicited suggestions for improving the intervention's feasibility and acceptability.

Extensive efforts were made to contact all participants. Participants were contacted for the first time via their preferred method. Preferred contact methods were overwhelmingly phone numbers; only one potential participant listed e-mail as the primary form of contact. If phone

numbers were disconnected or no longer associated with the individual at initial contact, and the family also had a working e-mail address on file, an e-mail survey was sent. Voicemail messages with contact information and reason for the call were left (if possible) when families did not answer phone calls. Additionally, when e-mail contacts existed, messages were sent when families could not be reached by phone after several attempts. Following four primary and secondary (when possible) contact attempts, communication with families ceased consistent with the protocol approved by the review board.

A visual representation of all aspects of NOURISH+ and the current study is presented in Figure 2.2. This figure also documents the number of participants retained or excluded in each step of the process and highlights the attrition pattern present throughout NOURISH+.

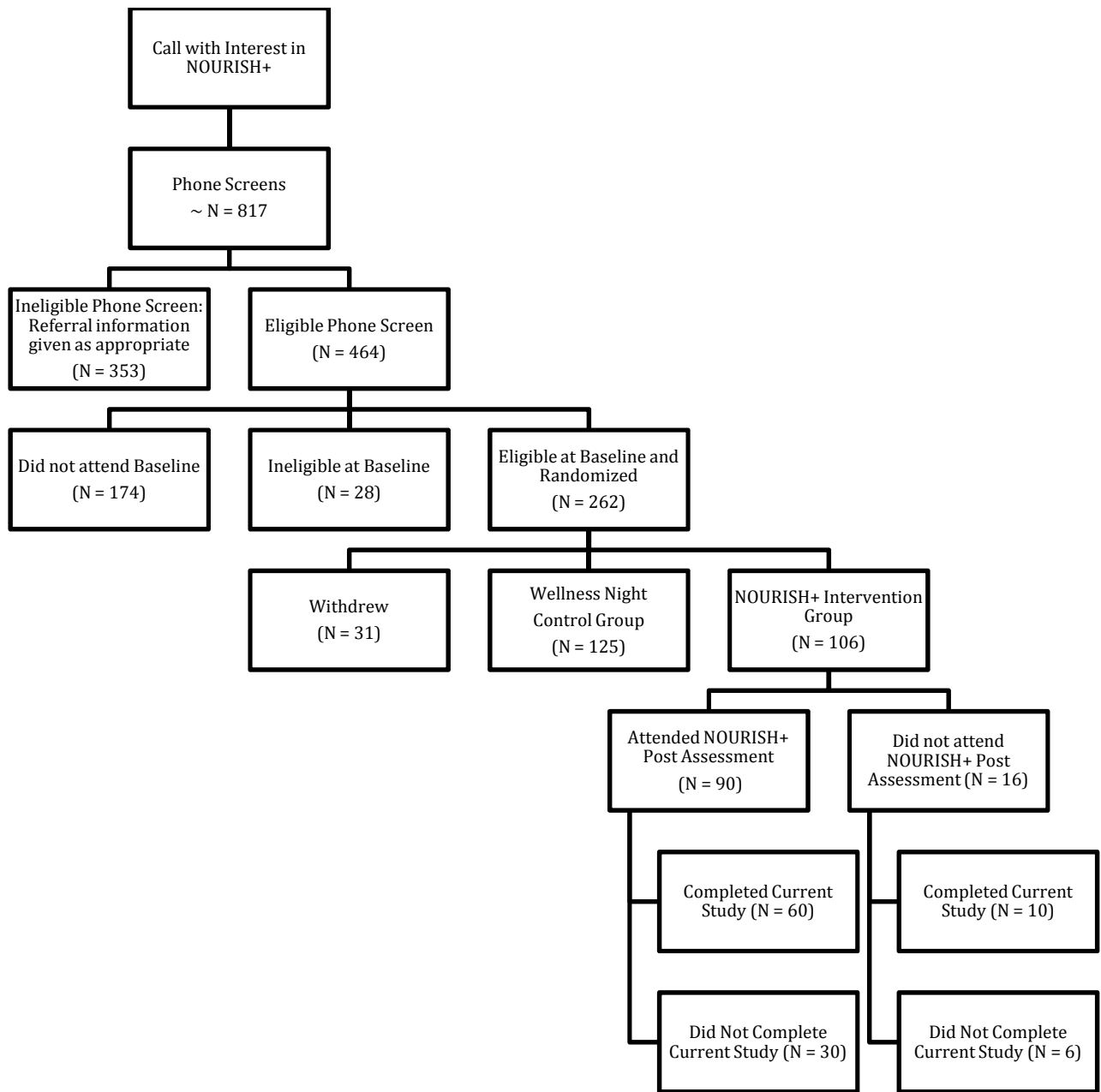


Figure 2.2 NOURISH+ and current study recruitment and retention strategy.

Current study data preparation. REDCap 6.3.0 was used for data entry and SPSS 22.0 was used for analysis. Data were downloaded from REDcap 6.3.0 and imported into SPSS 22.0. Descriptive statistics including means, standard deviations, and frequencies were calculated to verify that data met the assumption of the planned analyses. The final sample included 70 participants.

Analyses in the current study.

Preliminary Analyses. Descriptive statistics (frequencies, means) and non-parametric tests were calculated and used in subsequent analyses (t-tests, chi squares) assessing potential differences in demographic characteristics between those who participated in the current study and those who declined to participate.

First order correlation analyses were conducted to examine the associations between demographic factors and outcome variables to determine which, if any, demographic variables should be controlled for in subsequent regression analyses. If preliminary analyses indicated that demographic factors were highly correlated with outcomes of interest such as total barrier severity and dosage they would be controlled in regression analyses.

Factors that hindered parent participation. The first aim of the study was to identify commonly endorsed barriers to participation. Participation in the study was defined in two ways; number of sessions attended (dosage) and program completion (completion of post-testing). The number of NOURISH+ sessions attended (dosage) was also compared between individuals who participated in the current study and those who declined participation. Relations between dosage and program completion were compared in preliminary correlation analyses. The frequency with which each individual questionnaire item was endorsed across all families was calculated. The barriers most frequently endorsed for non-completers and completers were then calculated separately and differences between the groups assessed via chi-square tests.

Impact of barriers on attendance. The second aim of the study was to evaluate the impact specific barriers have on session attendance (i.e., intervention dosage). Preliminary correlations investigated whether significant relations existed between the total severity of all barriers endorsed, and the dosage or number of sessions attended. The total severity rating was

calculated as the sum of severity scores for each questionnaire item. If relations between total severity and dosage were significant, subsequent regression analyses were conducted.

Additionally, barriers rated highest in severity were noted for each family, and the frequency of items ranked with a high severity rating across families was summed. Preliminary analyses aided in determining potential relations between item categories and session dosage and program completion. The attrition literature has demonstrated that practical barriers as well as individual and family demands are among the most commonly reported hindrances to program participation and thus, were of particular interest when analyzing data from this sample. Both the practical barrier and individual and family demand categories were examined in relation to both session dosage and program completion. Additional questionnaire categories were examined in relation to study outcome variables if preliminary analyses indicated a relation might be present.

Demographic characteristics and reported barriers to attendance. The third aim of the study was to examine associations among demographic characteristics (race, income, parental education level, parental marital status, and number of children in the household), frequently reported barriers to attendance, and session attendance or “dosage” (Gunnarsdottir, Njardvik, Olafsdottir, Craighead, & Bjarnason, 2011).

Preliminary analyses aided in determining potential relations between demographic factors and session dosage and program completion. These preliminary analyses determined the need to control for demographic variables in subsequent regression analyses. Based on the findings of the preliminary correlations, multiple hierarchical regression analyses were performed to determine whether endorsement of specific barriers (namely practical barriers and individual/family demands) were associated with session attendance after controlling for any relevant demographic factors. A standard multiple regression analysis was performed to

determine if number of children in the household predicted total barrier severity. Lastly, an independent samples t-test was conducted to determine potential differences between one- and two-parent households on total barrier severity levels experienced by participants in the current study. Marital status of participants was reported at baseline. The marital status variable was dummy coded such that participants fell into two groups single (single, separated, divorced, widowed) or dual parent households (married). This was done to determine if families of one parent households reported a greater number of barriers than those in dual parent households.

Intervention feasibility and recommendations. The final aim sought to assess the perceived feasibility of NOURISH+ and recommendations for its future implementation. This was evaluated through parents' responses to structured, open-ended items. First, parents were asked to identify the issue(s) that made attendance most difficult. Second, parents were asked to identify the hardest part about completing the study. Third, parents were asked if anything about the program made it easier to attend. Fourth, parents were asked what would help families like theirs attend the intervention. Fifth, parents were invited to provide recommendations for the program. Lastly, parents were asked if they had suggestions relating to specific leader characteristics. Responses were coded to identify and categorize the major themes of responses. Thematic analysis (Braun & Clarke, 2006) identified major attitudes and beliefs about the feasibility, effectiveness, and acceptability of the current NOURISH+ intervention.

Results

Survey Contact and Participation

Of the 106 eligible participants, 70 participated in the current study and 36 declined to participate. Of the total 70 participants who completed the current study survey, the majority, (n = 60) did so over the phone; 10 completed the survey online. Thus, the overall response rate was

78.7%. Of the 36 individuals who declined to participate in the current study, some were unreachable due to phone numbers or e-mail addresses that were no longer in service while others had working numbers and e-mails, but declined participation through non-response to contact attempts. Eighteen of the 106 eligible individuals had telephone numbers that were currently out of service (or no longer associated with the participant); several of these participants had working e-mails and were sent an online survey. Of the 18 individuals with out of service phone numbers, but working e-mails, only one completed the survey.

NOURISH+ Attendance of Eligible Participants

Attendance (in NOURISH+) for the 36 individuals who declined to participate and the 70 participants of the current study are outlined in Table 3.1 and Table 3.2 respectively. A graphical representation of NOURISH+ session attendance for participants and non-participants of the current study is displayed in Figure 3.1.

Table 3.1

NOURISH+ session attendance for non-participants in current study (n=36).

	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Post-Assessment
Total	27	25	22	23	19	20	30
Percentage	75.0%	69.4%	61.1%	63.8%	52.7%	55.5%	83.3%

Table 3.2

NOURISH+ session attendance for participants in current study (n = 70).

	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Post-Assessment
Total	61	58	47	43	36	41	60
Percentage	87.1%	82.8%	67.1%	61.4%	51.4%	58.6%	85.7%

Table 3.1 displays session attendance for participants individuals who declined to participate in the current study. This table indicates that session five is the least attended session

of NOURISH+ among individuals who declined participation in the current study. Session 5 was also the least attended session among the 70 participants in the current study (see Table 3.2).

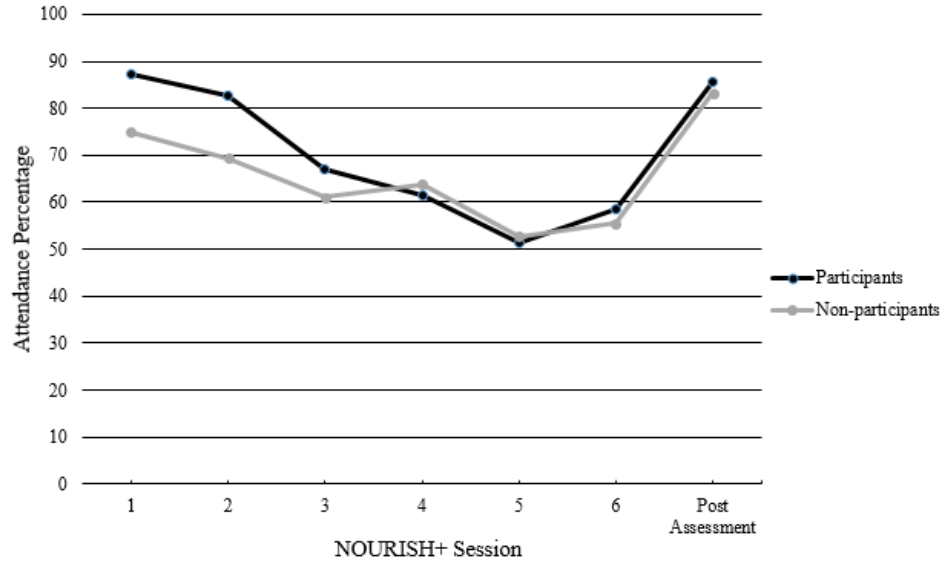


Figure 3.1 NOURISH+ session attendance in eligible participants.

Table 3.3 displays the frequency of NOURISH+ sessions attended by the 36 individuals who declined participation in the current study. Table 3.4 displays the frequency of NOURISH+ sessions attended (intervention dosage) by the 70 participants in the current study.

Table 3.3

Total number of NOURISH+ sessions attended by non-participants.

<u>Dosage</u>	<u>Frequency</u>	<u>Percentage</u>
Baseline	5	13.9
One session	0	0.0
Two sessions	4	11.1
Three sessions	4	11.1
Four sessions	5	13.9
Five sessions	12	33.3
Six sessions	6	16.7
Total	36	100%

Table 3.4

Total number of NOURISH+ sessions attended by participants

<u>Dosage</u>	<u>Frequency</u>	<u>Percentage</u>
Baseline	3	4.3
One session	4	5.7
Two sessions	4	5.7
Three sessions	9	12.9
Four sessions	16	22.9
Five sessions	19	27.1
Six sessions	15	21.4
Total	70	100%

The distribution of dosage presented in Table 3.3 and Table 3.4 indicated that some individuals in NOURISH+ only attended baseline and post-assessment. Thus, post-assessment attendance was not indicative of session dosage for all individuals. Therefore, dosage (i.e. the number of sessions attended) is a more accurate descriptor of program completion and was used as the primary outcome.

Participant Demographics

A variety of demographics were assessed both at NOURISH+ baseline assessments (for all 106 participants eligible for the current study), and in the current survey. Specifically race, marital status, educational attainment and household income were collected at NOURISH+ baseline assessments. Caregivers' race and age were assessed again at the time of the current survey. Additionally, caregivers were asked (in the current survey) to report the number of children and adults living in their household at the time of their NOURISH+ participation, as this information was not collected at NOURISH+ baseline.

Among caregivers who completed the survey, 60 (85.7%) were program completers (i.e., they completed post-assessments) and 10 (14.3%) were non-completers (did not complete post-

assessments). Participants ranged in age from 25-73, with a mean age of 41.81 years. Age was collected at the time of survey participation from those who completed the questionnaire.

Preliminary Analyses

Seventy individuals participated in the current survey, out of a total of 106 eligible NOURISH+ caregivers. Demographic characteristics of the 36 individuals who declined to participate in the current study were compared with those of the 70 current study participants. These data are presented in Table 3.5. (Of note, Table 3.5 reflects demographic information for the 70 individuals in the current study as well as the 36 individuals who declined participation). The information presented in Table 3.5 was collected at NOURISH+ baseline for both the 70 participants of the current study and the 36 individuals who did not participate.

Table 3.5

Demographic characteristics of participants and non-participants.

	Study participants <i>n</i> = 70		Declined participation <i>n</i> = 36	
	Frequency	Percentage	Frequency	Percentage
Race	<i>n</i>	%	<i>n</i>	%
Black/AA	50	71.4	25	73.5
White	18	25.7	5	14.7
Hispanic	2	2.9	0	0.0
American Indian/Alaskan Native	0	0.0	1	2.9
Other/More than one race	0	0.0	3	8.8
Decline to provide	0	0.0	2	5.6
Parent BMI				
20-25	9	12.9	3	8.3
25-30	13	18.6	8	22.2
30-35	11	15.7	7	19.4
35-40	15	21.4	3	8.3
40-45	9	12.9	8	22.2
45-50	3	4.3	3	8.3
50+	8	11.4	4	11.1
Declined to provide	2	2.9	0	0.0
Child BMI				
15-20	10	14.3	8	22.2
20-25	22	31.4	10	27.8
25-30	24	34.3	11	30.6
30-35	8	11.4	4	11.1
35-40	3	4.3	3	8.3
40+	2	2.9	0	0.0
Missing	1	1.4	0	0.0
Household Income				
Less than 15,000	7	10.0	12	33.3
15,000 – 24,999	6	8.6	5	13.9
25,000 – 34,999	6	8.6	1	2.8
35,000 – 44,999	11	15.7	4	11.1
45,000 – 59,999	7	10.0	3	8.3
60,000 – 74,999	3	4.3	0	0.0
More than 75,000	24	34.3	9	25.0
Declined to provide	6	8.6	2	5.6
Parent Education				
Less than H.S. diploma	2	2.9	2	5.6
H.S. diploma	8	11.4	6	16.7
Some college	17	24.3	8	22.2
College degree	20	28.6	12	33.3
Some graduate school	6	8.6	2	5.6
Graduate degree	12	17.1	4	11.1
Declined to provide	5	7.1	2	5.6
Completion Status				
Completer	60	85.7	31	86.1
Non-completer	10	14.3	5	13.9

Non-parametric tests were conducted to examine further potential demographic differences between those who completed the current study and those who declined to participate. Mann-Whitney U tests were conducted to determine if current study participants differed significantly from those who declined to participate on measures of household income and parental education. Results indicated that participants and non-participants differed significantly on household income such that participants reported higher household income than non-participants ($U = 774.5, Z = -2.40, p = .016$). The second analysis indicated that participants and non-participants did not differ significantly on levels of parental education ($U = 966, Z = -1.06, p = .291$).

Next, comparisons of the demographics of individuals in the current study who completed NOURISH+ post-assessment were compared with those in the current study who did not complete post-assessment (see Table 3.6). Specifically, Mann-Whitney U tests evaluated whether NOURISH+ completion was related to household income and parental education among those in the current study. Results indicated that, within the current sample, NOURISH+ completers and non-completers did not differ significantly on levels of household income ($U = 230.5, Z = -.339, p = .735$) or levels of parental education ($U = 219.5, Z = -.635, p = .525$). Therefore, in the current study household income and parental education did not differ based upon completion of post-assessment.

Table 3.6

Demographic characteristics by NOURISH+ completion status (completers vs. noncompleters).

	Program Completers (n = 60)		Program Non-Completers (n=10)	
	Frequency	Percentage	Frequency	Percentage
Demographics				
Race				
African American	42	70.0	8	80.0
White	16	26.7	2	20.0
Hispanic	2	3.3	0	0.0
Income				
Less than 15,000	7	11.7	0	0.0
15,000-24,999	5	8.3	1	10.0
25,000-34,999	4	6.7	2	20.0
35,000-44,999	10	16.7	1	10.0
45,000-59,999	4	6.7	3	30.0
60,000-75,000	3	5.0	0	0.0
More than 75,000	22	36.7	2	20.0
Declined to provide	5	8.3	1	10.0
Parent Education				
Less than HS diploma	2	3.3	0	0.0
HS diploma	8	13.3	0	0.0
Some College	13	21.7	4	40.0
College Degree	18	30.0	2	20.0
Some graduate school	6	10.0	0	0.0
Graduate degree	9	15.0	3	30.0
Declined to provide	4	6.7	1	10.0

Next, a correlation matrix was constructed to identify potential relations between demographics, item category mean severity, total item severity, dosage, and program completion status. These correlations were intended to inform subsequent analyses. Spearman's correlations were conducted for associations involving ordinal variables (race, income, parent education, dosage) and point-biserial correlations were conducted for relations including the dichotomous program completion variable. These correlations are displayed in Table 3.7.

Table 3.7

Correlation Matrix. Correlations between demographics, item categories mean severity, total severity, dosage, and completion variables. Statistically significant correlations have been bolded.

	<u>Race</u>	<u>Income</u>	<u>Parent Education</u>	<u>RD</u>	<u>TA</u>	<u>PCS</u>	<u>CF</u>	<u>UP</u>	<u>PB</u>	<u>IFD</u>	<u>HWB</u>	<u>Total severity</u>	<u>Dosage</u>	<u>Completion</u>	
Spearman's rho	<u>Race</u>	1.000	-.461**	.023	.111	-.136	-.160	.072	-.219	.079	-.212	-.065	-.127	-.054	-.142
	<u>Income</u>		1.000	.524**	-.042	.116	.185	-.122	.264*	-.029	.118	-.095	.118	.145	.066
	<u>Parent Education</u>			1.000	-.023	-.045	-.009	-.112	-.127	-.011	.031	-.117	-.064	.073	-.058
	<u>RD</u>				1.000	.045	.008	.012	.121	.201	-.056	-.088	.298*	.015	.144
	<u>TA</u>					1.000	.446**	.142	.214	.116	.008	-.027	.529**	.081	-.026
	<u>PCS</u>						1.000	.222	.382**	.246*	.155	.026	.540**	-.098	-.269*
	<u>CF</u>							1.000	.201	.140	.027	.081	.258*	.139	-.137
	<u>UP</u>								1.000	.071	.468**	.190	.555**	.114	.039
	<u>PB</u>									1.000	.140	.150	.641**	-.362**	-.209
	<u>IFD</u>										1.000	.216	.445**	-.037	-.062
	<u>HWB</u>											1.000	.213	-.201	-.376**
	<u>Total severity</u>												1.000	-.096	-.205
	<u>Dosage</u>													1.000	.512**

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

RD - Research Demands

TA - Treatment Approach

PCS - Program Components and Strategies

CF - Clinician Factors

UP - Uncomfortable Participating

PB - Practical Barriers

IFD - Individual and Family Demands

HWB - Health and Well Being

First order correlation analyses did not indicate significant associations between demographic variables and total barrier severity or session dosage. Therefore, no demographic factors were controlled for in subsequent regression analyses.

Participation was defined in two ways in the current study: session attendance (dosage) and program completion (completing post assessment). Preliminary correlation analyses indicated that dosage was highly correlated with program completion ($\rho = .512, n = 70, p < .01$). This positive association indicates that the more sessions an individual attended the more likely s/he would be to complete the NOURISH+ post-assessment. Given that frequency distributions indicated post-assessment attendance was not indicative of session dosage for all individuals (i.e. some participants did not attend any sessions but attended post-assessment), dosage was used as the primary outcome variable in analyses.

Factors that Hindered Parent Participation

To assess barrier severity, responses to each item were recorded, a score of 0 “not at all” implied that the participant did not endorse the item as a barrier to participation. Responses of a 1 “some” or 2 “a lot” indicated that the participant experienced the item content as a barrier to participation. Table 3.8 outlines the frequency with which participants endorsed each barrier and the corresponding severity rating.

Table 3.8

Endorsement and mean severity of questionnaire items.

Questionnaire Item	Did not Endorse	Endorsed low severity	Endorsed high severity	Mean severity Rating
1. I did not like completing the questionnaires	48	19	3	.36
2. My child and I did not like completing the physical assessment	58	10	2	.20
3. I had to wait too long to start the program	67	3	0	.04
4. The program did not deal with the causes of my family's problems	54	15	1	.24
5. Instead of working with my child, the program focused too much on me	41	20	9	.54
6. The program was not working	59	9	2	.19
7. I would have preferred an individual program	43	19	8	.50
8. I would have preferred a self-help program	51	14	5	.34
9. The behavior change goals were too hard	60	9	1	.16
10. There were too many behavior change goals involved	63	6	1	.16
11. The program sessions were boring	62	7	1	.13
12. The program was difficult to understand	67	2	1	.06
13. The program took too much time	61	5	4	.19
14. The topics of the sessions were not relevant to my family	59	8	3	.20
15. The format was too structured	67	2	1	.06
16. The leaders way of talking was hard to understand	68	2	0	.03
17. The leaders had different values or beliefs than me	65	3	2	.10
18. The leaders put too much pressure on me	69	1	0	.01
19. The leaders did not seem to have enough qualifications	68	1	1	.04
20. I did not feel comfortable talking about my family	67	3	0	.04
21. My child did not want to make an effort to participate in the program	58	9	3	.21
22. I was nervous about taking part in the program	55	12	3	.26
23. I did not think my child had a problem	59	7	4	.21
24. I wasn't ready to make the changes that the group discussed	60	9	1	.16

Table 3.8 continues

Table 3.8 continued

25. I would have preferred the program was given directly to my child instead of me	52	13	5	.33
26. I didn't feel like I was making as much progress as other people in the group	53	15	2	.27
27. Getting to the sessions was difficult because of transportation	59	3	8	.27
28. I had a long way to travel to sessions	44	8	18	.63
29. Session times were not convenient	49	14	7	.40
30. My family responsibilities interfered with coming to sessions	46	17	7	.44
31. My work schedule interfered with coming to sessions	56	9	5	.27
32. I wanted to be in the less intensive group/ the group that only met one time for the wellness night	64	4	2	.11
33. My family had too many other problems occurring at the same time	59	7	4	.21
34. There were too many pressures going on around me	58	6	6	.26
35. I was having financial problems that the group didn't understand	62	6	2	.14
36. I did not want to participate because the program interfered with other aspects of my life	69	1	0	.01
37. Other members of the family made it difficult for me to make the changes I wanted to make	50	13	7	.39
39. My health made it difficult to participate	62	7	1	.13
40. I was feeling too unhappy to participate	69	1	0	.01
41. My child was feeling too unhappy to participate	64	6	0	.09
42. I stopped coming because I felt like I missed too many sessions	64	6	0	.09

The current study also examined the barriers most frequently endorsed by participants ($n = 70$). The most commonly endorsed barriers to participation are outlined in Table 3.9.

Table 3.9

Commonly endorsed barriers to attendance (category, rate, and percentage).

<u>Statement</u>	<u>Item Type</u>	<u>n</u>	<u>Percentage</u>
“Instead of working with my child the program focused too much on me”	Treatment approach	29	41.5%
“I would have preferred an individual program”	Treatment approach	27	38.5%
“I had a long way to travel to sessions”	Practical barrier	26	37.1%
“My family responsibilities interfered with coming to sessions”	Individual and Family demands	24	34.4%
“I did not like completing the questionnaires”	Research demands	22	31.4%
“Session times were not convenient”	Practical barrier	21	30.0%
“Other members of the family made it difficult for me to make the changes I wanted to make”	Individual and Family demands	20	28.6%

The most commonly endorsed barrier was treatment approach. Specifically, many parents felt that children were not involved enough. Additionally, many parents felt an individual program, rather than a group format, would have better suited their needs. Practical barriers including travel distance and session time were also commonly reported hindrances to treatment attendance. Some parents reported that they did not like completing the questionnaires at baseline and post assessment. Lastly, individual and family demands were significant obstacles both to attendance and to implementation of healthy lifestyle changes.

Frequency ratings identified the barriers rated as most severely impacting participation, as indicated by how commonly they were given the highest rating on the scale (2 = *a lot*). The barrier most frequently rated a 2 was, “I had a long way to travel to sessions,” which was endorsed by 18 participants (or 25.7% of the sample). Other barriers receiving high severity ratings included: “Instead of working with my child, the program focused too much on me” (12.9%), “I would have preferred an individual program” (11.4%), “Getting to the sessions was

difficult because of transportation” (11.4%), “Session times were not convenient” (10%), “My family responsibilities interfered with coming to sessions” (10%) and “Other members of the family made it difficult for me to make the changes I wanted to make” (10%). A chi-square test evaluated whether total barrier severity differed between completers and non-completers.

Completion status did not differ significantly by total barrier severity rating $\chi^2(22, N = 70) = 24.49, p = .322$.

Completers and non-completers were also compared with respect to their rates of item endorsement. Data from these groups assessing item endorsement are presented in Table 3.10 and Table 3.11 respectively.

Table 3.10

Most Frequently Endorsed Barriers by Completers.

Statement	Item Type	N	Percentage
“Instead of working with my child, the program focused too much on me”	Treatment approach	25	41.6%
“I would have preferred an individual program”	Treatment Approach	23	38.3%
“I did not like completing the questionnaires”	Research demands	21	35.0%
“I had a long way to travel to sessions”	Practical barrier	20	33.4%
“Other members of the family made it difficult for me to make the changes I wanted to make”	Individual & Family demands	19	30.7%
“My family responsibilities interfered with coming to sessions”	Practical barrier	18	30.0%
“Instead of working with my child, the program focused too much on me”	Treatment approach	25	41.6%

Table 3.11

Most Frequently Endorsed Barriers by Non-completers.

Statement	Item Type	N	Percentage
“Session times were not convenient”	Practical barrier	7	70.0%
“I had a long way to travel to sessions”	Practical barrier	6	60.0%
“My family responsibilities interfered with coming to sessions”	Practical barrier	6	60.0%
“The program took too much time”	Program components & strategies	5	50.0%
“I did not think my child had a problem”	Uncomfortable participating	4	40.0%
“My health made it difficult to participate”	Health & well-being	4	40.0%
“I stopped coming because I felt like I missed too many sessions”	Non-completers	4	40.0%

Among program completers, treatment approach, practical barriers, and individual and family demands accounted for most of the difficulty in attendance for those who completed the program.

Non-completers represented a small minority of the current sample, only 10 of the 70 participants in this group. Among these individuals, the most commonly endorsed barrier was “Session times were not convenient” (70%). Other commonly reported barriers among non-completers included “I had a long way to travel to sessions” (60%), “My family responsibilities interfered with coming to sessions” (60%), “The program took too much time” (50%), “I did not think my child had a problem” (40%), “My health made it difficult to participate (40%), and “I stopped coming because I felt like I missed too many sessions” (40%)

An independent samples t-test indicated there was no significant difference in total barrier

severity for non-completers ($M = 52.6$, $SD = 11.37$) and completers ($M = 48.75$, $SD = 5.43$); $t(68) = 10.55$, $p = .319$. These results indicate that although completers and non-completers might have differed slightly on reported barriers to attendance, the perceived severity of these barriers did not differ between these two groups.

Impact of Barriers on Attendance.

The current study also sought to evaluate the impact that specific barriers had on session attendance (i.e. intervention dosage). Spearman's rank correlations were conducted between race, income, parent education, all eight category mean severity ratings, total severity, and dosage. Each of these variables was also correlated with NOURISH+ completion (a dichotomous variable where 1 = attended post assessment and 0 = did not attend post assessment) using point biserial correlations.

Correlation analyses indicated that practical barrier severity was associated with session attendance ($\rho = -.362$). In contrast, other questionnaire categories (i.e. research demands, treatment approach, program components and strategies, clinician factors, uncomfortable participating, individual and family demands, and health and wellbeing) were not significantly associated with dosage). In the current study, practical barriers were defined as including transportation issues (obtaining reliable transportation each week), travel to sessions, session times, family responsibility interference with session attendance, work interference with session attendance and preference for the control group. This definition was based on that used in prior research (Brennan et al., 2012). Given the significant correlation between practical barriers and session dosage, a follow up multiple regression analysis was conducted to determine which practical barriers were driving this association. The overall model was significant $F(6, 63) = 6.357$, $p < .001$, $R^2 = .377$; all practical barriers together accounted for 37.7% of the variance in

session attendance. Only one independent variable, session time, (i.e., time of the day the session was conducted), accounted for significant variance in session attendance ($\beta = -1.306, p < .001$). Session time had a significant negative regression weight indicating that after accounting for the other practical barriers, individuals with higher levels on endorsement on the session time item had lower levels of session attendance.

Although individual and family demands were hypothesized to be associated with session attendance, preliminary correlation analyses did not identify significant associations among these variables. Therefore, no further analyses between individual and family demands and session attendance were conducted.

Demographic Characteristics and Reported Barriers to Attendance.

Associations among demographic characteristics (e.g., race, income, marital status, number of children) and frequently reported barriers to attendance were evaluated. Spearman correlation analyses suggested there was no significant association between participants' race, income, marital status, or education level and their total barrier severity score. For this reason, the demographic factors of race, income, marital status and education level were not controlled for in subsequent regression analyses.

Spearman correlation analyses did not indicate a significant association between the number of children in the household with dosage ($\rho = -.118, p = .335$), or between the number of children in the household and total barrier severity ($\rho = .086, p = .482$).

Marital status of participants was reported at baseline, and was dummy coded such that participants fell into two groups single (single, separated, divorced, widowed) or dual parent households (married). This was done to determine if families of one parent households reported a greater number of barriers than those in dual parent households. An independent samples t-test

was conducted to determine if marital status (one parent households versus two-parent households) was associated with total barrier severity. Results indicated that marital status had no significant effect on barrier severity $t(62) = .350, p = .727$.

Intervention Feasibility and Recommendations

Qualitative data were collected via open-ended items to explore attitudes and opinions about barriers and facilitators to NOURISH+ participation. Responses were transcribed during each survey. Responses revealed important information about the way participants understood and engaged in the NOURISH+ program. A selection of responses that captured commonly reported themes for each question are included in Table 3.12.

Table 3.12

Selection of major theme statements from Free Response Questions

Free-Response Questions	Selected Responses
What would you say was the issue that made it the most difficult to attend?	“hard to get through traffic to be at sessions on time” “travel time back and forth between work and home was a lot” “got back home too late to help with family responsibilities” “child sports or extra curricular activities” “too many things going on in life”
What do you think was the hardest part for you about completing this study?	“trying to stick with changes while maintaining everyday life” “resistance from husband and child.”
Was there anything about the program that you felt made it easier to attend?	“casual, relaxed setting to talk openly” “inviting and non-judgmental.” “opportunity to meet new people” “See the same people week to week” “different cultures and backgrounds” “share opinions” “hearing from people in similar circumstance” “dealing with the same things” “childcare - wouldn’t have been able to attend otherwise.”

Table 3.12 continues

Table 3.12 continued

<p>What do you think would help families like yours attend this intervention?</p>	<p>“different location” “closer location” “give ideas for meal preparation on a budget” “better distribution of flyers” “available parking” “make it more about the kids” “information on health effects of being unhealthy” “pediatrician interaction”</p>
<p>If you could make any recommendations to the program what would they be?</p>	<p>“more child involvement” “help kids understand why it is a good idea to make changes” “information about alternative healthy snacks” “more about caloric intake, sodium and fat” “give out healthy recipes” “include ways for families to be more active” “child exercise groups” “keep trip to the grocery store – it was a wealth of information” “keep the hands on cooking class” “cooking class motivated kids to learn about food” “liked opportunity to meet with nutritionist” “discuss more about peer pressure and junk food eating” “hold parents more accountable”</p>
<p>What about the leaders? Would you have liked them to be different in any way? What characteristics would you have preferred in a group leader?</p>	<p>“personable”, “cheerful”, “flexible”, “invested”, enthusiastic”, “supportive”, “empathetic”, and “sensitive.” “leaders were compassionate and good listeners” “leaders were invested” “young and skinny” “everyone was healthy and slim, have someone parents could relate to” “co-facilitator who is a parent and has first hand experience” “it’s different when you don’t have children” “need more experience working with childhood obesity and not just textbook experience”</p>

Parents were asked to identify the issue(s) that made attendance most difficult. Travel (both distance and time) was commonly cited. Parents reported that it was, “hard to get through traffic to be at sessions on time” and, “travel time back and forth between work and home was a

lot.” Additionally, given the time of the sessions (6 or 6:30 p.m.), several parents reported they, “got back home too late to help with family responsibilities.” On a related note, attending sessions was difficult due to scheduling issues, such as working sessions around “child sports or extracurricular activities,” or there were, “too many things going on in life” at the time attend all of the group sessions.

Next, parents were asked what they perceived to be the hardest part about completing NOURISH+. Many parents declined to answer this item, felt that their responses on the first question were sufficient, or they did not perceive one particular factor as the most challenging. Among those that did provide answers, the majority identified transportation as their primary difficulty. Specifically, a few families reported that reliance on public transportation resulted in long travel times. One family stated that travel time to sessions was over an hour via the city bus even though the family lived only about nine miles away. Another family reported walking to sessions. Thus, their family represents another case for which the distance traveled is not far, but travel time was lengthy. Another caregiver relied on a Medicaid transport van to travel to sessions, which often required long wait time and a lot of planning. Other participants cited time, work, and family schedules as hindering attendance. In addition, barriers such as, “trying to stick with changes while maintaining everyday life” or receiving “resistance from husband and child” were noted by some parents.

Parents were also asked if anything about the program made it easier for them to attend. Many took this opportunity to share their positive evaluations of the group format and echoed a theme of “connectedness” among parents. When describing the group format, participants said it was a “casual, relaxed setting to talk openly” that was “inviting and non-judgmental.”

Additionally, many parents reported appreciating the opportunity to “meet new people”, “see the

same people week to week” from “different cultures and backgrounds” and “share opinions” with other parents. Participants really enjoyed “hearing from people in similar circumstances” and talking to families “dealing with the same thing.” Parents seemed to enjoy having an open discussion and receiving feedback from other others who seemed to understand their own struggles. Another aspect of the program that parents thought made attendance easier was access to childcare provided by the NOURISH+ program during each session. A few parents stated that childcare was essential to session attendance and they “wouldn’t have been able to attend otherwise.”

Parents were asked what would help families like theirs attend the program consistently. One common thought parents expressed related to advertising and recruitment. Some stated there needed to be “better distribution of flyers” and “more knowledge that this program exists.” Offering session meetings at a “different location” or “closer location” was relatively common feedback, as well.

Parents were then asked to provide recommendations to the program. The major theme of these recommendations was “more child involvement.” Participants felt “children should be more included” and that this might, “help kids understand why it is a good idea to make changes.” Parents felt that increased child involvement could “work with parents to deliver messages to kids” and that, “children may listen to other people more than they will listen to parents.” Another suggestion was the addition of in-session physical activity components and “ways for families to be more active.” A few parents suggested a larger focus on “healthy snack ideas” and “portion control.” In addition to these suggestions and recommendations, many parents provided opinions about the aspects of the program that they enjoyed and which activities they thought should be retained for future iterations of the program. Several ($n = 10$) reported that they really

enjoyed the grocery store tour, describing it as “mind-blowing,” and a “wealth of information.” Some parents ($n = 13$) also enjoyed the cooking class which allows both parents and their children the opportunity to attend a “hands-on cooking class” and participate in cooking a healthy meal for all attendants. Participants appreciated that this “motivated kids to learn about food.” Lastly, several participants ($n = 10$) “liked one-on-one time with the nutritionist,” an opportunity that NOURISH+ offers for each family.

Lastly, parents were asked if they had suggestions about leader characteristics. Overall, parents felt that the leaders were appropriate, and described leaders as “personable,” “cheerful,” “flexible,” “invested,” enthusiastic,” “supportive,” “empathetic,” and “sensitive.” Several parents did comment that the leaders were predominantly “young” and “skinny” and these characteristics made it difficult to relate to them. On a similar note, a few parents suggested that the inclusion of leaders who are parents themselves might enhance their credibility.

Discussion

Rates of childhood overweight and obesity have virtually tripled since the 1980’s and approximately 23% of children aged 2-19 are overweight or obese (Lakshman et al., 2013; Pena et al., 2012). Additionally, children from minority and low-income backgrounds are especially vulnerable to overweight and obesity (Cote et al., 2004; Pena et al., 2012). Pediatric obesity is a serious public health issue given its association with physical health comorbidities and complications and impact on social and psychological functioning (Lakshman et al.).

Although many researchers have devised programs to treat pediatric obesity, attrition continues to plague these interventions (Bennett & Glasgow, 2009; Geraghty, Wood, & Hyland, 2010). The current study explored barriers to participation in a parent-focused childhood obesity and healthy lifestyle intervention targeting caregivers in a racially diverse urban setting.

Most Commonly Endorsed Barriers to Participation

In the current study, the most commonly endorsed barriers to session attendance were aspects of treatment approach (e.g., focus of treatment), practical barriers (e.g., transportation), research demands (e.g., completing questionnaires), and individual and family demands (e.g., family problems, financial problems). Specifically, parents in the current sample reported that the program had too much of a focus on them and did not involve their children as much as they would have liked. This feedback was reflected in the open-ended responses, as well.

NOURISH+ focuses on parent training with an emphasis on parental role modeling to foster healthy lifestyle behaviors in children. Although the rationale behind the parental focus of NOURISH+ is addressed in sessions, it is possible that this message is not communicated as explicitly as intended.

Additionally, families reported difficulty attending the group sessions for reasons such as session time of day and the distance that they had to travel to the sessions. Although NOURISH+ focuses on recruitment within close proximity to the Richmond city limit, several participants appeared to have challenges related to travel time rather than travel distance.

Difficulty working around a busy family schedule was another common barrier. Extracurricular and other family and school activities made it challenging to attend sessions and to implement the behaviors discussed during the intervention. Although timing seemed to be an issue for many families, there was no overwhelming agreement on an ideal time of day for the program, as some families would have preferred earlier times (such as right after school) and others would have liked a later time or a weekend session. Finally, overall perceived barrier severity did not differ between completers and non-completers. However, completers were generally better able to overcome these barriers.

Type of Barrier and Session Attendance

The current study assessed not only the number and severity of barriers but also the strength of the associations between barriers and session attendance. Findings indicate that, perhaps the *number and severity* of endorsed barriers are less important than the *type* of barriers endorsed. Practical barriers (e.g., time, travel, transportation, etc.) were the only type of barriers associated with session attendance.

This is not very surprising, as practical barriers are commonly cited reasons for early termination in weight management interventions (Grossi et al., 2006). However, several distinct barriers are often subsumed under the “practical barriers” category. The current study used the definition of practical barriers from Brennan and colleagues (2012). These authors defined practical barriers as transportation, travel to session, time of session, family responsibilities that interfered with session attendance, work issues that interfered with session attendance, and a preference to be in the control arm of the study. Results of the current study indicated participants who perceived their practical barriers as more severe attended fewer sessions. Conversely, participants who rated their practical barrier severity as low were more likely to attend more program sessions. Session time (of day) was the practical barrier with the greatest impact on session attendance. However, participants were not in agreement regarding which time of day would be preferable, as some individuals reported earlier times would be better and others suggested later times or weekend dates. Thus, it is somewhat difficult to determine how best to incorporate this finding into research and practice, as offering multiple session times, particularly within a group setting, is not always feasible. Nonetheless, current results indicate interventionists should attempt to be as flexible with session times as possible.

Demographic Characteristics and Reported Barriers to Attendance

Previous attrition research has demonstrated that low SES can present a powerful obstacle to obesity treatment and adherence (Mauro et al., 2008). Given that NOURISH+ targets racially and ethnically diverse low-income families, it was hypothesized that family income would be associated with the perceived severity of practical barriers. However, this hypothesis was unsupported in the current sample. One possible explanation for this finding might be due to restriction in range of income in our sample, which would make it difficult to detect true effects. Additionally, several commonly endorsed barriers to session attendance such as family responsibilities and travel time to sessions are not necessarily experienced only by those with low-income. Families with greater levels of comfort traveling in the city and/or higher familiarity with session locations might have been more likely to attend sessions regardless of their income. Psychological factors such as commitment to change or to completing the program, could also impact attendance. Moreover, several different locations for sessions (facilities on the VCU campus, in the near West End, downtown at the YMCA) have been utilized throughout the duration of the NOURISH+ program to attempt to maximize convenience and accessibility for participants. Therefore, questions regarding travel time might be difficult to compare across participants from different waves that were held at differing meeting spaces.

In the current study, the number of children residing within a participant household was not associated with the perceived severity of practical barriers. Several explanations may account for this finding. Of the 70 participants in our sample, the number of children ranged from 1 to 5, with the majority of families ($n = 60$) having 3 children or less and the average family consisting of 2.17 children. It is possible that, in the current study, there was a restriction in the range of number of children per family, which might attenuate any true effect.

Single parent families in this study did not report a significantly greater number of barriers than those living in two-parent homes. One limitation of this study is that marital status was used as a proxy for household caregivers. It should be noted that, even in single parent families, a significant other or family member might serve as a caregiver, which could have confounded the current results.

Parent Feedback and Program Recommendations.

Barriers to attendance. As noted above, practical barriers were the most commonly endorsed barriers to program participation. Specifically, many parents had issues with transportation including difficulty finding reliable transportation from week to week, utilizing the public bus transportation system, or relying on external transportation such as the Medicaid car service. Other practical barriers to attendance included distance or transportation time to travel to sessions. Many participants noted that, while a downtown location was preferable to a suburban one, parking in this area was a challenge, particularly at night. Some parents did not like the timing of the sessions and noted it forced them return home later than they would have preferred, and/or required them to wait longer than usual for a bus. Lastly, several parents struggled with practical barriers that involved family schedule or work demands.

Several parents expressed desire for an opportunity for make-up sessions and increased flexibility with regards to session attendance as possible program changes. NOURISH+ participants are encouraged to attend sessions even if prior sessions have been missed. Every attempt is made to review missed material with parents after a missed session. However, currently, there are no opportunities to make up missed group sessions or to attend another group in lieu of a missed session as several parents suggested. This decision is based on the research protocol designed to minimize risk of exposure of group members to individuals in different

arms of the study. A few parents also noted that the day of the week on which their sessions were held was not maximally convenient for their family. When planning each wave of the study, every effort is made to try to find a most convenient night for the families involved; however, there is rarely one night that is ideal for every family in the group. Additionally, staff availability limits the options available for group meeting scheduling.

It should be noted that a few participants from earlier waves of the NOURISH+ program indicated barriers that have since been remedied. These barriers included the use of only one location for meetings and lack of recruitment in the western end of Richmond. At present, NOURISH+ utilizes several different locations across the Richmond area for assessments and sessions, and its advertising reach has greatly expanded across waves of the study.

Aids to attendance. Although many parents expressed interest in an individual program, qualitative data suggest that the many liked the group format because it helped them feel connected with other parents having similar experiences. Another aspect of the program which made it easier for parents to attend was that childcare was offered. Parents also stated that receiving money from the baseline assessments as compensation served as an incentive. This finding is interesting as parents are only paid at baseline and post-assessments, and not for their attendance at each of the six sessions. It is possible that parents found the baseline assessment incentives useful in overcoming certain practical barriers (e.g., transportation), as the incentive could cover the cost of gas or bus fare.

Program focus. Several participants noted that they wanted their children more involved in the program. NOURISH+ focuses on parent training with an emphasis on the importance of parental role modeling to foster healthy lifestyle behaviors in children. Previous research has demonstrated the limited effectiveness of interventions that focus solely on the obese child. To

combat this problem, family-based interventions have been utilized; however, the most effective ratio of parent to child involvement has yet to be understood (Golan et al, 2006). In contrast, parent-only approaches have demonstrated increased effectiveness in child weight-reduction as well as increases in cost-effectiveness (Bean et al., 2012; Janicke, Sallinen, Perry, Lutes, Silverstein, & Brumback, 2009). NOURISH+'s focus on parental role modeling is discussed throughout the intervention. However, it may be useful to make the distinction between child-centered treatment and the NOURISH+ approach more apparent to participants. Parents might not have fully understood the reason for the parental focus of the program. This might explain why many parents felt there was not appropriate child inclusion. This rationale includes decreasing focus on the overweight child as this can lead to decreased self-esteem and increased risk for disordered eating among children (Au, 2011; Best et al., 2012). Also, a parent-focused approach utilizes caregivers' role in improving the health of the entire household, which could lead to greater health benefits than child-centered interventions.

Recommendations to the program. Participants' primary recommendations for the program addressed child involvement, content, and leadership. The most common suggestion centered on increasing child involvement in the NOURISH+ program. Participants felt that having the child attend at least a portion of the adult group sessions would be beneficial. Parents felt this would help to impress upon children why healthy lifestyle changes are important. A challenge in the application of this suggestion revolves around the large age range (5-11) of the children recruited for NOURISH+ and tailoring materials that could be readily understood by children at various developmental levels. Additionally, given that the focus of NOURISH+ is to empower parents to be influential role models in their children's lives, a shift in focus could put too much attention on the overweight or obese child, which might cause unintentional negative

effects, including lowered self-esteem and eating problems (Golan, 2006; Epstein, Paluch, Roemmich, & Beecher, 2007; Ross et al., 2010). Other suggestions such as providing workbook-style activities and discussing child-friendly and fun physical activity options, appear to be more readily assimilated into the existing NOURISH+ structure.

Participants also suggested several topics that could be added to the program. Food-related suggestions consisted of additional information on recommended caloric, sodium, and fat intake, as well as dealing with junk food snacking, and providing more alternative healthy snack ideas and recipes. Several parents also indicated that they would have liked more concrete suggestions for family physical activities. Lastly, peer influence on healthy lifestyle choices was offered as an additional topic to cover in sessions. Although bullying and teasing are covered in NOURISH+, there could be additional attention paid to the role peers play in eating, exercise and body image attitudes and behaviors.

Finally, several program recommendations focused on group leaders. Although parents appeared to have an overall positive experience of the group leaders, several personal characteristics might be important to consider when planning future interventions. Parents indicated that it was difficult to relate to leaders who were “young” and “skinny.” Parents might have had difficulty relating to a leader who had different physical characteristics from themselves and the majority of participants. Additionally, a group leader who is a parent would have more perceived credibility when discussing parenting techniques and influence. Historically, the group leaders have been doctoral students in the counseling or clinical psychology graduate programs, which is a limited pool. Future work both in this program and beyond might look to expand the diversity of the pool of potential group leaders to the extent feasible.

Strengths and Limitations of the Current Study

The current study replicated and extended a recent investigation of attrition from a pediatric obesity intervention conducted in Australia by Brennan and colleagues (2012). There were some notable differences between the two studies. Brennan and colleagues used a longer, 72-item questionnaire with both adolescent and parent completers and non-completers of an obesity intervention. These researchers were able to contact 91% of parent completers and 94% of parent non-completers. In the current study, only 66% of participants who were eligible to complete the survey were successfully contacted (70 out of a possible 106). We were able to contact 65.2% of completers and 71.4% of non-completers. Several factors might account for the differences between the study by Brennan and colleagues and the present investigation.

Participants in NOURISH+ represent historically underserved populations, primarily African American families. African American mothers represented 71.4% of the participants interviewed for the current study. Few investigations of attrition from pediatric obesity studies have been conducted with diverse families. Although some prior studies included ethnic minorities, these investigations did not include sufficient numbers to draw specific conclusions relevant to African Americans (Ammerman, Leung, & Cavallo, 2006; Tershakovec & Kuppler, 2003). The inclusion of a diverse sample of participants from an urban community is a strength of the current study. Additionally, by using some items from the questionnaire developed and utilized by Brennan and colleagues (2012) in a much more diverse and urban sample, these data enabled investigation of whether some barriers were particularly influenced by income or other contextual (including cultural) factors.

A limitation of the current study includes potential sampling bias. Because NOURISH+ participants represent come from a relatively low-income, diverse, and transient population, there

were challenges in making contact with potential participants. Given the population and the fact that earlier waves of NOURISH+ were conducted as many as two years prior to the current study, several contact numbers were no longer in service. Moreover, many participants had not provided an email contact. Further, parents may have resisted further involvement with NOURISH+ if they dropped out of the program or failed to attend all of the scheduled sessions. Families who terminated prematurely or had inconsistent attendance (at sessions and/or follow up assessments) might have felt ashamed or worried that NOURISH+ staff were angry or disappointed with them. This might account for the larger percentage of completers in our sample compared with non-completers. Additionally, the current study did not offer an incentive for completion of the questionnaire as it was intended to be a brief interview that would take most parents between 5-10 minutes. This lack of incentive may have discouraged participants from calling researchers back in response to messages.

Moreover, recall bias is a concern. The questionnaire asked families to respond to past events; for some families the NOURISH+ treatment might have ended quite some time ago and they might not have felt confident in their ability to recall aspects of the program or their participation. In sum, it is possible that the individuals who decided to participate in this study might be fundamentally different from participants who declined to do so. Additionally, the current study might have suffered from demand characteristics. It was clear to participants that the individuals conducting the phone surveys were affiliated with the NOURISH+ program. This could have been understood from the phone number from which the phone calls took place or from the detail in the survey regarding the program. Participants may have been apprehensive about sharing the full extent of their opinions about the program or might not have wanted to endorse questionnaire items that were worded negatively. Nonetheless, this study will make an

important contribution to the literature, as understanding how to decrease barriers to participation in interventions like this one will improve the effectiveness of future efforts targeting ethnically diverse children at risk for pediatric obesity

Clinical Implications for Future Studies

Previous obesity treatment efforts have highlighted the problem of attrition; yet, there is no comprehensive identification of the characteristics that predict program completion or non-completion. Pediatric obesity interventions require parents' participation. In addition, research supports that, even after program completion, parents play an invaluable role in fostering a supportive environment in which they act as role models of healthy lifestyle choices in the areas of exercise and nutrition (Ball et al., 2012). Thus, for pediatric interventions to be successful, it must be possible for both children and adults to maintain new lifestyle changes in the long-term. Although research has demonstrated that family-focused parenting interventions are the most efficacious treatments for childhood obesity prevention, the results of the current study suggest that perhaps a parent-focused intervention may not be exactly what parents of overweight children are seeking. Future studies should consider that perhaps attrition in low-income minority families may be due to a mismatch between what the researchers and parents believe is the best style of treatment for their children. Even if parental skill building and role modeling are goals of an intervention, if parent's needs and expectations are not being met treatment outcomes will likely suffer due to higher attrition.

When trying to work with at-risk populations, researchers may need to develop more innovative ideas to increase parent engagement with the treatment program. This might include not only giving parents more of what they want (child involvement), but also working at the parental level to facilitate attendance. One such approach could be concerted efforts to decrease

stigma surrounding participation in a healthy lifestyle intervention. Parents might be ashamed or uncomfortable participating in a group format surrounding weight and lifestyle behaviors. This discomfort might further increase if a session is missed. Future programs should address the issue of stigma. One possible suggestion could be inviting participants to bring another individual who is not enrolled in the study with them to sessions. This could make parents feel more comfortable initially which could enhance parental engagement. Another strategy to decrease stigma would be broadening inclusion criteria surrounding weight so parents do not associate shame with the attendance of a group intervention.

Additionally, the current study indicated parents appear to enjoy group formats where they feel connected to other parents who endorse similar struggles with their children. One possible way to increase parental engagement that capitalizes on the group cohesion could be pairing parents in the group together in a “buddy” system. This could serve not only to facilitate group cohesion but will likely also foster additional participant accountability regarding attendance. One possible way to group parents into teams could be by participant’s home location. Many participants in the current study voiced concerns about transportation and travel time. If parents were matched based on region of the city, parents may be able to arrange transportation. A buddy or matching system could also be a great way for parents who miss sessions to catch up on the material that was missed at a particular session.

Lastly, increasing parental engagement can start at the level of the group leaders. Participants in the current study reported difficulty relating to the group leaders as they did not share the same physical characteristics. Although it might not always be possible for interventions to include leaders with diverse criteria, the issue of differences can be approached in a way that facilitates group comfort and cohesion. The ability to relate to group leaders

seemed important within the current sample. Future researchers should consider the stimulus value of leaders and how this can be managed and discussed with the group to promote a safe and welcoming space. Future studies should also consider training leaders in cultural competence and strategies for discussing their own stimulus value with participants. An acknowledgement and discussion of differences inherent between group leaders and participants would likely strengthen the working alliance and might increase parent engagement. Leaders should be taught to discuss issues surrounding racial, weight, age, and parental status differences with participants and field any concerns surrounding those issues in order to increase credibility. The topics of weight and parental status appeared particularly salient for participants in NOURISH+.

Conclusion

Studies of pediatric weight management interventions have demonstrated the effectiveness of parent and family focused programs over those that focus solely on the overweight child. However, current findings indicate that when targeting low-income, racially diverse urban families, parental perception of child involvement is very important. This suggests that to retain racially diverse at-risk families in weight management interventions, meeting parental expectations and increasing parental engagement are paramount. Therefore, understanding parental desires and expectations is crucial to tailoring culturally appropriate and sensitive weight management interventions for families at risk for childhood obesity. Appropriate matching of parental expectations and program components will aid in participant retention. This is particularly important for demographic groups that appear particularly prone to dropout.

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Appendix A

Phone Questionnaire Interview Script

Interviewer

We are contacting you because you recently participated in the NOURISH+ study.

We found that a lot of people that started our program had a hard time completing the study or coming to all of the meeting times. This is a problem that a lot of studies find when working with families.

We are interested in understanding some of the issues/barriers/problems people face when trying to attend interventions/treatments.

We are asking families to complete a quick 10-15 minute questionnaire over the phone to help us understand barriers to completing NOURISH+ and ways that we can improve for future families who participate. Your feedback would be very helpful.

Are you willing to complete the brief questionnaire?

Interviewer

Next we are going to ask you a few questions about some reasons that people find it hard to participate and/or complete studies like NOURISH+.

We are going to ask you to what extent each of these statements about NOURISH+ were true for you. Or what extent you agree with the statement

We are going to ask you to give you answers on a 0-2 scale

0 – Not at all

1 – Some

2 – A lot

You can just say this applies to you “not at all”, “some” or “a lot” if you don’t want to use the numbers

	Not at all	Some	A Lot
1. I did not like completing the questionnaires	0	1	2
2. My child and I did not like completing the physical assessment	0	1	2

3. I had to wait too long to start the program	0	1	2
4. The program did not deal with the causes of my family's problems	0	1	2
5. Instead of working with my child, the program focused too much on me	0	1	2
6. The program was not working	0	1	2
7. I would have preferred an individual program	0	1	2
8. I would have preferred a self-help program	0	1	2
9. The behavior change goals were too hard	0	1	2
10. There were too many behavior change goals involved	0	1	2
11. The program sessions were boring	0	1	2
12. The program was difficult to understand	0	1	2
13. The program took too much time	0	1	2
14. The topics of the sessions were not relevant to my family	0	1	2
15. The format was too structured	0	1	2
16. The leaders way of talking was hard to understand	0	1	2
17. The leaders had different values or beliefs than me	0	1	2
18. The leaders put too much pressure on me	0	1	2
19. The leaders did not seem to have enough qualifications	0	1	2
20. I did not feel comfortable talking about my family	0	1	2
21. My child did not want to make an effort to participate in the program	0	1	2
22. I was nervous about taking part in the program	0	1	2
23. I did not think my child had a problem	0	1	2
24. I wasn't ready to make the changes that the group discussed	0	1	2
25. I would have preferred the program was given directly to my child instead of me	0	1	2
26. I didn't feel like I was making as much progress as other people in the group	0	1	2
27. Getting to the sessions was difficult because of transportation	0	1	2
28. I had a long way to travel to sessions	0	1	2
28b. How long did you have to travel? _____ mins			
29. Session times were not convenient	0	1	2
29b. What times would have been better _____			
30. My family responsibilities interfered with coming to sessions	0	1	2
31. My work schedule interfered with coming to sessions	0	1	2
32. I wanted to be in the less intensive group/ the group that only met one time for the wellness night	0	1	2
33. My family had too many other problems occurring at the same time	0	1	2
34. There were too many pressures going on around me	0	1	2
35. I was having financial problems that the group didn't understand	0	1	2
36. I did not want to participate because the program interfered with other aspects of my life	0	1	2
37. Other members of the family made it difficult for me to make the changes I wanted to make	0	1	2
38. When you participated in NOURISH+- How many adults and how many children lived in your household?	0	1	2

39. My health made it difficult to participate	0	1	2
39b. Do you or your child have asthma? Child-Y Adult-Y NO	0	1	2
40. I was feeling too unhappy to participate	0	1	2
41. My child was feeling too unhappy to participate	0	1	2
42. I stopped coming because I felt like I missed too many sessions	0	1	2

Interviewer

Now we have just a few questions that you can answer any way you like. Don't worry about the scale. We just want to get an idea of some of the things you liked and didn't like about the program so we can see what things we should change about our program.

Free Response:

1. What would you say was the issue that made it the most difficult to attend?
2. What do you think was the hardest part for you about completing this study?
3. Was there anything about the program that you felt made it easier to attend?
4. What do you think would help families like yours to attend this intervention?
5. If you could make any recommendations to the program, what would they be?
6. What about the leaders? Would you have liked them to be different in any way?
 - a. What characteristics would you have preferred in a group leader?

If indicated that parent or child has asthma:

Interviewer

We are trying to do a version of NOURISH+ to be compatible with families who suffer from asthma. In order to find out how to best help these families we are trying to get some information from either parents with asthma, or parents of children with asthma. Would you be willing to be re-contacted when we start gathering information for this project?

Demographics

What is your age? _____

What is your race?

- a. White/Caucasian
- b. African-American/Black
- c. Hispanic/Latino
- d. Asian/Pacific Islander
- e. Native American
- f. Other

Do you consider yourself Hispanic?

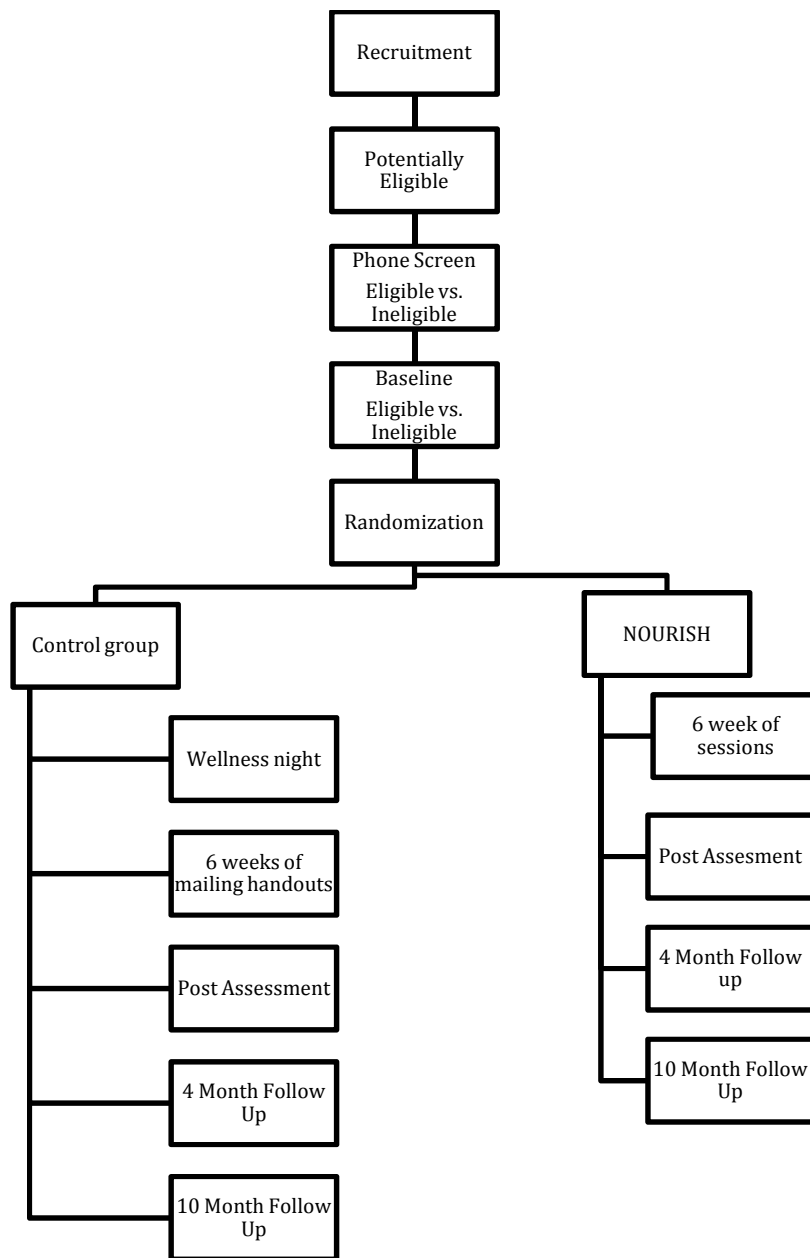
- a. Hispanic
- b. Non-Hispanic

How many adults live in your household? _____

How many children live in your household? _____

Appendix B

NOURISH+ Enrollment Flow Chart



Vita

Melissa Ann Kwitowski was born on February 19, 1989, in Frederick County, Virginia, and is an American citizen. She graduated from Notre Dame Cathedral Latin High School, Chardon, Ohio in 2007. She received her Bachelors of Arts in Psychology from The Ohio State University, Columbus, Ohio in 2011. She then worked one year at Case Western University, Cleveland, Ohio in from 2011-2012 and one year at Nationwide Children's Hospital, Columbus, Ohio from 2012-2013.